THESIS

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Economic evaluation of Organic, Synthetic Fertilizer and Use

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Table of Contents

1. INTRODUCTION

Over the past few months, due to the latest events, the production of fertilizers to the agricultural sector, the production and management of food and natural resources in a broader sense, has been facing a wide range of difficulties, challenges that require solutions beyond the recent industrialization and automation of agricultural activities.

Russia's large -scale military invasion against Ukraine, global climate change, the need for resilient national and regional food systems and the guarantee of sustainable subsistence means for small farmers are all related to current tensions in agriculture, especially the increase in prices of your inputs.

Improve productivity, dialogue Diplomatic agreements, effectiveness and competitiveness of agricultural activities can be keys to respond to challenges in a current demanding environment. Thus, meeting the requirements of recent challenges requires complex analysis to plan possible solutions. There are different ways to face challenges. In this present monograph, economic evaluation of the use of organic and synthetic fertilizers we turn our focus to one of the possibilities: provided by the background of solutions given by small, medium and large farmers, and the technological readiness necessary to facilitate their impacts on production productivity agricultural. Circumstances, investments and other factors that determine the general situation of the agricultural history of a country or region. Participating in the foreign and internal market of the European Union.

Hungary has only a few possibilities to face current challenges and, among them, the production of large -scale agricultural products, the rational use of available fertilizers seems to be important. In the following chapters a brief history will be presented about Hungarian agriculture its main crops, and application of soil fertilizers that ensure greater production and economic performance.

The competitiveness problems that arise in the domestic market, the variation of prices to demand and scarcity of food products, in markets, has the solution in the optimized use of available resources. Thus, achieving an income in the more economical, qualitative and quantitative, ecological and sustainable agribusiness, are all potential results of the low level of pricing, difficult acquisition, high production costs of fertilizers observed in today's market, then decreasing to Production and the development of agribusiness, increasingly the notorious presence of the decrease in cattle, pigs, sheep due to the scarcity of pasture production, which contributes to the decrease in production of organic fertilizers.

Industry that is taking place in the market. In connection with this topic, it is necessary to obtain an overview of Hungary's position in this field, if there are obstacles in this process and especially which ones. Thus, the objective of this thesis is to economically evaluate the variation of organic, inorganic fertilizers and their use, to define, where Hungary and its agricultural sector are in the process, acquisition of creation and necessary improvement of the conditions that will determine its future competitiveness, what are the potential deficiencies and what kind of public responses are being formulated in the margin of limited maneuver allowed by adherence to the EU about these challenges. Recognizing the deficiencies at certain points shows where relevant actors should put more emphasis and effort, whether determinants at the EU level or arising from the domestic field, whether public or private investment.

Hungary is a country with extremely favorable natural resources in agricultural production, which offer potential harvests of excellent quality and large amounts. It was therefore possible to develop agriculture for a thousand years, is a country located in eastern Europe, with its exact location in the Carpathian Basin, according to the Hungarian Central Office, Hungary has an estimated population of 9.7millions of people, the Hungarian being its official language.

The territory of Hungary is administratively subdivided into 42 regions, of which 19 are county and 22 are designated of urban counties, having as Budapest the capital city. It has its border delimited to the north with Slovakia, to the east to Romania, to the south of Serbia, to the southwest Croatia, to western Slovenia, Austria northwest and Ukraine to the Northeast. It is part of the member countries of the European Union, NATO, OECD, VISEGRAD group and Schengen Space.

During the Austro-Hungarian Empire, Hungary was the main territory used for agriculture. The vast plains that cover 90% of the country and the fertile lands in abundance favored the intensive use of agriculture throughout their history. During the socialist period, agriculture was mechanized and modernized. But with the end of the USSR, Hungarian agriculture lost its support from the state and suffered a crisis, only equating its production of 16 million tons of grain in the 21st century. The country has a continental temperate climate, with a cold and humid winter and a hot summer. The average annual temperature is 9.7 ° C, with extremes of 42 ° C and -29 ° C.
The rainfall average is 600 mm per year. The rains are irregular, falling west of the Danube than to the east.

1.1. Aim of the research

This thesis aims to investigate the use of fertilizers both organic and artificial and the cause of the change in their prices, due to the exacerbated situation of the sharp increase in production costs, focusing on agricultural production.

Russian military aggression against Ukraine began on February 22, 2022 and the sanctions imposed, contracted by Russia, caused adverse economic consequences in both domestic and foreign market. Having constantly and drastic altered fertilizer prices due to the rising price of natural gas, but also due to the direct use of energy from agricultural production processes.

2. LITERATURE OVERVIEW

2.1. Global Fertilizer Crisis

The Agricultural Sector Conference, which took place in November 2022 in the European Parliament, had as its outcome, a new common agricultural policy of the European Union to 2023.

The growing price of gas has caused many companies, such as Yara Internacional, Asa and Borealis Ag reduce their production due to nitrogen fertilizers. As a result, the increase in the risk of global food scarcity Russia is a very important element in the global fertilizer production and distribution sector due to sanctions, war with Ukraine, fertilizer exports were stopped. (Asvini, 2018)

This increase in price has forced European producers to reduce their ammonia production, thus increasing the high costs of entry of agricultural companies and further increasing the risk of world food shock. Natural gas, among other subjects, is used as a raw material for nitrogen fertilizers, and about 80% of production costs are usually used.

Currently, the European gas market rate has increased, about ten times more than a previous year, so global food prices jumped to a record at the end of last month.

Ammonia manufacturer Yara Internacional, which occupies the second position in the world announced on March 9 that it would temporarily restrict production in one of its affiliations located in France, and the company's European facilities will be reduced to only 45% of real capacity until the final of the week. The two plants produce 1 million tons of ammonia per year and 900,000 tons of urea, and the company produces a total of 4.9 million tons of fertilizers per year in Europe. The other large European company that also had its affected fertilizer production was Borealis, reducing its ammonia manufacturing capacity due to current high prices. On the other hand, Virginia Wieser are almost interrupting production for economic reasons. According to analysts Europe can continue to import fertilizers from other regions of the world, where gas prices are lower, but possible emission reductions are likely to have a negative impact on global supply.

When Hungary, Hungary Nitrogen Works Ltd. He saw his production of ammonia temporarily interrupted. According to the company's strategic director, its fertilizers will stop within a few days due to limited ammonia storage capacity.

2.2. Hungarian fertilizer market

The number of fertilizers sold by distributors, rightly to farmers in the first half of 2022 was 795,000 tons.

However, as fertilizer prices increased three times, on average, it also appeared in sales volume, which was significantly, almost a third less than a year earlier in the same period. As a result, in the first six months of this year, net sales of fertilizers were HUF 198.6 billion, which is twice the result of the same period of 2021. Among the most important fertilizers,

30% of nitrosol increased 30% in the second quarter of 2022, compared to the same period of the previous year. (Ács, 2018)

The increase in fertilizer prices is not recent, as it has started in the fall of 2021 and has been continuous since then. The drastic increase in the price of natural gas alone significantly increased production costs, but as this is one of the raw materials for fertilizer production, gas prices release was influenced twice by industry.

Although in the first quarter of 2022 it was questionable if there were enough fertilizers for spring, until the outbreak of the Russian-Ucranian war, all should have a higher price in the coming months. Then, first, European manufacturers announced that they would stop or reduce their production and exports in view of the uncertain situation, and then Russia and Ukraine interrupted exports abroad. Since then, fighting parties have been able to agree with Turkish mediation and exports of Ukrainian agricultural products have begun, and negotiations have been carried out in the export of Russian fertilizers. The fertilizer bought by farmers in the first half of 2022 had an active nitrogen-phosphorus (NPK) substance of 258 thousand tons, 113.6 thousand tons or 30.6%less than one year earlier. Potassium content was 37.8% lower and phosphorus 38.7% lower than during the base period, nitrogen decreased to a lower degree by 28.2%. (Chamber, 2020)

An examination of the natural weight of fertilizers sold directly to farmers, it can be observed that from 795,000 tons of fertilizers 670,000 tons of single component and 125,000 tons were complex fertilizers, which means that the proportion of single and complex component fertilizers was 84: 16.

It was revealed by the analysis of the Agricultural Information System, which, as in previous years, the highest demand for of Cal, was in the first half of 2022, 45% of total fertilizer traffic, 54% of the single. The sales component of nitrogen fertilizers had a total sale of 355,000 tons. However, this value was 23% lower than the first half of 2021. The second most popular product with 55,000 tons was urea, of which 36,000 tons were sold more than ammonium nitrate, 16,000 tons. These two products covered almost 9% of total fertilizer sales in the first half of 2022.

Demand for super-phosphate from 18 to 20.5% was higher than the base period, 893 tons, but the total number of single component phosphorus fertilizers decreased by almost 70%. Potassium chloride sales were 6.7 thousand tons, 5.7 thousand tons less than a year earlier.

The most popular composition of compound fertilizers, the NPK 8-24-24 was 21,000 tone covering 2.6% of the total fertilizer sales, while 16.8% of complex fertilizers sold. In the first half of 2022, the NPK was 15-15-15, of which 17.8 thousand tons were sold and the NPK was 10-26-26 and 9.7 tons. Having as its bets of 14% and 7.8% of the total sale of complex fertilizers during the period under review.

2.3. **Prices in the first half of 2022**

According to the Central Statistics Office, the price level of agricultural producers increased by 40.3% and the price level of agricultural expenses in the first half of 2022 compared to the same period of 2022. Pricing prices increased in 44.2% and the price of live animals and animal products increased by 31.5% compared to the first half of 2021. The price

of cereals increased by 61.3% and for industrial plants 56.6%. The price of potatoes was 20.7% higher than the base period. Fertilizer prices increased a little more than three times material prices for agricultural production, but pesticide prices increased 16.7% and veterinary products were 10.4% more expensive, but also in the price of significant prices, with Prices increasing by 38.9%. Of the materials tested, the price of seeds was 18.5% higher than the same period last year. (Chamber, 2020)

Hungarian producers were even less confronted with the consequences of descendants this year, as many bought enough fertilizers for the stoning season last year (and for a fraction of current prices), but this option is no longer available. Thus, industry actors need to decide to be sure and buy several times more fertilizers or wait. The latter, however, is a very risky decision, as the future of fertilizer production is quite uncertain in Europe. On February 22, 2022 an independent entity recognized the non-governmental controls of the regions of Ukraine Donetsk and Luhanski. On February 24, 2022, September 24, a military aggression began without provocation and unjustified against Ukraine.

The European Union and international partners immediately responded to severe violations of Ukraine territorial integrity due to Ukrainian sovereignty and independence. After the sanctions against Belarus was introduced by promoting Russian military aggression. In the following days, new measures were adopted and Russia has decided to take certain restrictive economic countermeasures.

In this context the Russian military aggression against Ukraine, the sanctions imposed and the counterfeit taken by Russia, triggered adverse economic consequences for the domestic market and the foreign market.

Being involved of several European Union companies in the economic market, directly or indebtedly resulted in major consequences for example, reducing the demand, the interruption of contracts, projects existing to loss of revenue, especially in the form of raw materials and pre - Producers, or in the form of others, will no longer be available or economically affordable.

In the agricultural sector, the cereals of Ukraine and Russia mainly corn, wheat and oily seeds such as; Sunflower, colza and starch derivatives will result in a significant increase in price mainly in animal feed. Thus, the combined effect of the increase in the above cost, energy and agricultural products, requires the use and rational application of fertilizers, for the increase in food production, and in search of alternative solutions. (Asvini, 2018)

The situation is exacerbated by the sharp increase in production costs, it can be explained in part, having altered the increase in the price of nitrogen fertilizer due to the dramatically increase of natural gas prices, but also by direct use of energy from agricultural production processes. How Russia and Belarus are an important producer and exporter of the three basic fertilizers; Nitrogen, phosphorus and potassium, fertilizer prices will increase and especially as a result of sanctions.

For example, currently due to the increasing and continuous increase in prices, agricultural producers are obliged to buy fertilizers in fewer quantities at this time compared to 2021.

The most recent data according to the Institute of Agricultural Economy Research on the Hungarian fertilizer market, the search for fertilizers in the first quarter of 2022 dropped 21% compared to the same period in 2021. The largest drop in Looking for ammonium nitrate and potassium chloride, while the highest requirement was by calcium ammonium nitrate and nitrosol fertilizers. As expected, the purchase of fertilizers rose in the first quarter, this increase at this time of year, but was 21% lower than in 2021. Meanwhile, the average fertilizer prices increased by 1.7-17.1% in the period analyzed.

The growing demand of fertilizers such as; Calcium and Nitrosol ammonium nitrate, together they accounted for 88% of fertilizer sales in March. Meanwhile, these products were 2-3.5 times with higher prices than in March 2021. Price increase mainly affected nitrogen-based fertilizers.

In contrast ammonium nitrate and potassium chloride, demand fell 67% and 37%, respectively. Given the current situation of the Russian invasion in progress of Ukraine market shocks continue to affect these developments in an important way. (Agroberichten Buitenland 'Agricultural Network, 2022).

It is known that fertilizer prices are not a new phenomenon, despite the drastic changes that have been happening recently in the market since the fall of 2021, prices have constantly increased, which led to the conclusion that this could affect this year's agricultural production. Natural gas alone significantly increased production costs, being one of the raw materials in fertilizer production, influenced in a right way in its increase being the second that this happens.

1. Figure: Fertilization
Font: Agrarszektor.hu

2.4. **The role of nutrients in plant nutrition**

Nutrient grouping according to the quantitative and use aspects necessary for the structure of the plant's body.

Macronutrients: NPK
Mesoelements: Mg, S, Ca

Micronutrients: Mn, Zn, Mo, Ni - Fe, B, Cu, CO
Others elements: Si, Na, cl.

Plants can reuse macro nutrients within their bodies and transport them from one place to another if external supplies are not timely. Nutrients in the soil do not exist for themselves, but are integrated into soil tissue as a three -phase complex system, interact with their constituents and other nutrients and form an extremely complex system. (Lajos, 2015)

Interaction between nutrients that reinforce the absorption of each other, an interaction in a synergistic way, and that act against each other, antagonically. value from the point of view of plant cultivation can be determined by considering several factors such as:

- Water solubility from the compound
- Tendency to connect to the soil
- Stability
- Relationship with plant metabolic processes (may enter the plant as it has been applied or should be transformed into another compound).
- Its relationship with living matter - its physiological effect, if it comes into direct contact with the living tissue of the plant or in solution.

All of these properties significantly influence the role, purpose and technology of applying a compound in plant nutrition, their knowledge is extremely important because there is no application can decrease in yield and, therefore, economic damage to cultivated crops and soil. (Lajos, 2015)

2.5. **Macronutrients**

Nitrogen

It has the function of playing a fundamental role in the growth of the aerial part of plants and the formation of fruits, the creation of plant proteins and, therefore, also in the quality indicators of culture.

It is indispensable during initial development and vegetative growth. Nitrogen drastically increases the mass of sprouts and their performance, played a decisive role in the structure of amino acids and proteins. Nitrogen also has the importance of being a basic component of substances that play a decisive role in heredity, chromosomes, nucleic acids. (Lajos, 2015)

Phosphor

It has a multiple role in plant life processes, because it is being involved in almost all metabolic processes.

It is a building block of many cell -forming compounds. It is indispensable in photosynthesis, breathing and basic processes of biological synthesis is of great importance in the processes of transportation, storage and energy service of the ATP plant, ADP. It plays a key role in compounds that carry hereditary properties. It is also found in the nutrient reserve of seed cultures, which is vital for plant germination.

It plays a role in the development of plant immunity, since many compounds involved in this process are based on phosphate. Although it is an essential element, its effect of increased income is not as spectacular as nitrogen, because it does not increase the development of the vegetative parts. On the other hand, it is decisive in generative processes and affects the amount and quality of culture.

Potassium

Potassium has a positive effect on plant photosynthesis and metabolism.

It basically determines the osmotic potential of cells, the turgor of plants and plant tissues and influences water management. Improves the efficiency of plant water use, affects the functioning of the closing cells of air exchange openings. Increases active absorption of water through the roots, reduces evaporation.

Frost tolerance improves well -supplied plants with potassium. Reusable element, activating many enzymes. Due to its beneficial effect on carbohydrate metabolism, plants that store carbohydrates (potatoes, beets) are particularly sensitive to K's supply. Dicotyledon plants usually respond more favorably to potassium than single -stroke.

Calcium

Calcium deficiency causes many physical disorders or unequal distribution in plant organs. It plays a role in the functioning of cell membranes and regulating its permeability.

Calcium is responsible for stabilizing cell walls and increases plant resistance to toxic heavy metal concentrations. Participates in the regulation of carbohydrate metabolism and is essential for healthy root growth. Dicotyledons' demand is higher, calcium absorption is inhibited in acid soils.

Magnesium

It is the central component of chlorophyll, participates in photosynthesis, amino acid and protein biosynthesis, energy balance and is an enzyme catalyst. It plays an important role in maintaining cationic balance.
The demand for legumes is double that of corn. It is transported only from the roots to the leaves, so that the plant absorbs the magnesium supplied with the leaf fertilizer, but cannot transport it to the older leaves or to the roots. (Lajos, 2015)

Sulfur

It plays an important role in the structure of enzymes, proteins and vitamins. He participates in photosynthesis, the synthesis of fatty acids, and is a sulfur -containing amino acid construction block.

Oilseed plants have a greater need for sulfur, it is the constituent of compounds that determine volatile substances such as smells and flavors. However, it plays an important role in supplying nutrients from plants grown to this end such as onion. Helps in the functioning of the plant immune system.

Boron

Usually the total iron content of soil is relatively high, but the amount that can be absorbed by plants is usually small. Soil soluble iron content increases with decreased pH. Iron absorption is hampered by the presence of other cations, non -mobilizable elements. It has a role in various enzyme processes, breathing and photosynthesis. Grapes, fruits, vegetables, soy, beans and linen are sensitive to iron deficiency.

It plays a necessary role for DNA synthesis, embryonic development, hormonal regulation, indispensable in carbohydrate metabolism, translocation, nitrogen and phosphorus metabolism, protein synthesis.

About half of the sugars produced in chloroplast during daytime photosynthesis are transported by plants to the roots at night. More than half of the sugar delivered to the root is excreted by the plant in the form of root secretions through the hair roots, thus feeding the sea of microorganisms that live in symbiosis with the root system.

These microorganisms make the nitrogen fixation "in return", turn compounds of phosphorus connected into water soluble, destroy pathogens, and among other activities. Each of the chloroplasts that make up chloroplast has a small "trapdoor" that "opens" at dusk and allows sugar compounds to flow out, the function of this trapdoor is controlled by a boron compound. If the trapdoor does not open, sugar compounds are enriched in chloroplast and the intensity of photosynthesis decreases.

Boron also plays a very important role in fertilization and fixing of seeds, as well as the proper formation of cell walls, being present in the soil in the form of boric acid and boratos, and plants also use it in these forms. It is linked to the content of soil organic matter and stored as a negatively charged ion. A low humus content also means a low supply of boron, as boron is a nutrient that tends to be leached. As the clay fraction increases, the boron content decreases.

Manganese

It is a very essential micro election as the soil pH decreases, the amount of manganese ions that can be absorbed increases. The use of acidifying fertilizers also improves absorption in the fertilized soil layer.

Manganese plays a role in photosynthesis, oxidation-reduction processes and enzyme activation. Manganese is also a switch and canola key micronutrient, even if it is less spoken than copper or boron! It has an important role in treating plant reactions to stress, in the functioning of the plant's immune system.

Plants use manganese and iron to play many compounds that play a role in defense against harmful microbes and insects. Soil iron ratio is an important condition for the healthy functioning of the plant's immune system, which requires the development of such balance that iron should always be present in soil solution to greater concentration than manganese. The marble of the leaves occurs in turnip and alfalfa, and dry spots in cereals.

Acid soils usually have a low manganese content, because leaching is significant due to increased water solubility of manganese compounds in acidic conditions. In limestone soils, its relative absence is more common as it is present in the soil solution non -absorbably, such as manganese.

Zinc

It is found in the soil in the form of zinc salts, its solubility increases as the chemical effect decreases. It can be absorbed as ZN ions or complex compounds. It has an important role in nitrogen metabolism, hormonal synthesis, enzymatic complex formation and enzyme activation.

Its capture is significantly affected by other metallic ions, and an antagonistic effect against phosphorus can also be observed. Especially in limestone soils, zinc deficiency can be detected in case of high phosphorus visibility due to zinc phosphate connection, this is a relative zinc deficiency.

Copper

It is mainly found in complex or soil compounds, the soluble copper content increases when the soil is acidic.

It plays a role in protein synthesis, carbohydrate metabolism and photosynthesis, is an enzymatic catalyst. It also plays a role in the symbiotic fixation of nitrogen, although this is not yet clear. Plants absorb it as ions or to a small measure in the form of complex compounds, copper salts and complex compounds are also absorbed by plant leaves.

Molybdenum

Of all microelements, it is necessary to less, but at the same time is an important creator of enzymes, its absence causes disturbances in nitrogen metabolism. Butterflies and cruciferous plants require larger quantities, monocotyledons are less sensitive to the supply of molybdenum. It is typically absorbed in the form of ions.

Cobalt

It has an important role in the formation of vitamin B12. It is especially important for butterflies as it is necessary for the functioning of nitrogen -fixing bacterial species. Plants can also absorb it through the leaves.

Nickel

Plants absorb it in ionic form. Its role in enzyme activation is the most important as it is an important trace element for nitrogen metabolism and is also necessary for the functioning of other enzymes.

Sodium

It is an essential nutrient for plants that like salt, these plants require a greater amount of it to keep the turgor and grow. Plants such as saccharin beet, celery, chard, mustard, radish, cabbage.

It is also an essential nutrient for many plants that make photosynthesis, there is probably a link between the type of photosynthesis and the efficiency of water storage in plants. Relationship between sodium and potassium ions is special if we look from the point of view of plant nutrition. These two ions are identical in size.

In plant life processes, potassium can be replaced small by sodium, but at the same time, the disturbance of balance has undesirable consequences. Among the cations stored in the colloids of the clay of the soil, potassium and sodium are present in large quantities, but their proportion is decisive from the point of view of plant life.

Plants cannot distinguish between the two ions, because they enter the root of the plant and are transported by the same mechanism. Plants, it seems, assume that potassium is always present at a higher concentration, however, always absorb the ion present at a higher concentration to greater extent, even if this proportion is reversed. However, this has serious consequences. Sodium increases under the influence of heat, destroys cell walls, disturbs the water's water balance and carbohydrate metabolism does not work, only works on salt -like plants survive in saline soils.

Chlorine

Essential nutrients, however, like sodium, plants require different amounts and tolerate higher concentrations in different ways. The physiological requirement is quite low, except for plants that like salt, is of the order of trace elements.

Plants that absorb chlorine in larger quantities usually have greater water content, because chlorine is an important osmotic agent and plays a role in the water balance of the plant.

And lastly silicon (SI), the silicon content of plants also varies greatly, which indicates that individual species differ greatly in their silicon needs.

Monocotyledon plants usually contain an order of magnitude more than dicotyledon plants. For example, oats and rice are high silicon plants. Even today, its exact role in plant physiology is unclear, it is known that it plays a role in defense against pathogenic fungi and the effects of stress, be it dry, thermal shock, saline or metallic toxicity, in the form of various compounds. It also plays a role in strengthening plant sprouts. According to research, plants absorb it in the form of various silicic acids.

2. Figure: EC and soil pH
Source: phmero.hu

2.6. **Soil pH**

Acidity is a genetically determined property of forest soils, pasture soils and some alluvial soils, but the application of fertilizers, especially that of ammonium and urea nitrate, can cause an increase in acidity in all low carbonates with low carbonates buffering capacity.

According to previous data from the soil monitoring system, about 50% of Hungarian soils are acidic and most require improvements due to their high levels of hydrolytic acidity. The application of soil chemicals is highly recommended in 15% of sampled areas, and recommended by 20%.

2.7. **Use of fertilizers in Hungary**

Soil is one of humanity's most precious natural goods, as it could be from Hungary, due to its important function for agricultural production. With this we will see an overview of Hungary's national potential, including trends in soil nutrient management in recent decades,

At the time of time as a result of intense research, production methods came out of their concentration in the amount to the emphasis on quality, this new mode of execution brought with its greater challenges to the agricultural community in cost efficiency and sustainability.

The preservation of soil fertility is the main prerequisite for soil sustainability. But to be achieved it must not make any necessary pressure on the environment, making environmentally healthy agricultural practices performed. The economic aspect is extremely important as it should be equal to the intensity of production, leading to rational use of soil nutrient management, for its application specifically in the place in question. Fertility is an extremely important factor that contributes to biomass production, yet other soil factors such as detoxification, filtering, water storage capacity and nutrients should be kept to meet the requirements of sustainable agriculture. (Lajos, 2015)

In 1860 the German scientist Justus von Liebig mentioned the need to achieve sustainability in agriculture. Noting that soil fertility has always been something could destabilize or maintain united societies, and that could make nations and states collapse or become glorious. (Asvini, 2018)

Formerly landowners, they faced problems of lack of capital and insufficient ground nutrients, causing only large properties to have access to updated technologies. Most farmers and peasants knew very well from the next steps to take, however, the challenges that arose as, delayed in the introduction of crop rotation systems, manure of manure, lack of labor, in - yielding, made it difficult to perform certain projects and actions to assert.

It was then during this phase that the need for soil fertilization was seen. It was said that the land would never be exhausted if the farmer did not get tired of cultivating it properly and

providing him with the necessary amount of nutrients. Then convinced that the basis of healthy agriculture was in manure and fertilization.

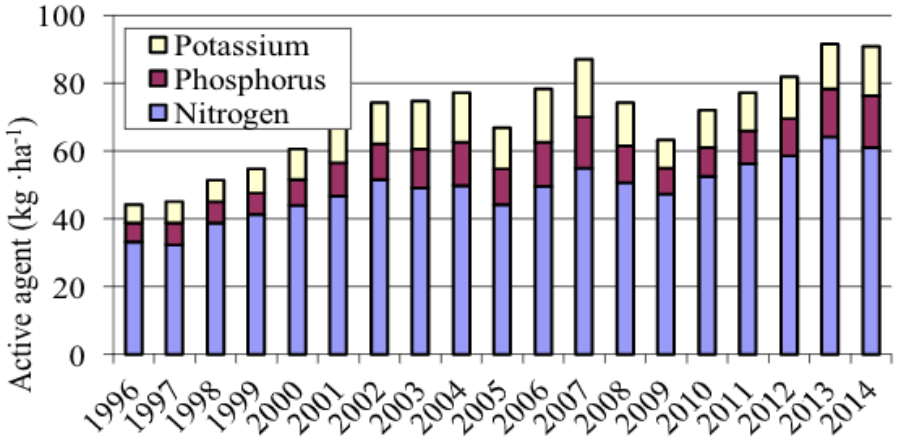
In the mid-19th century the French chemist Jean-Baptiste Boussingault, Justus von Liebig, Carl Sprengel, were able to prove that the nutrients contained in the corral manure could be replaced by industrial fertilizers. The production and use of chemical fertilizers and large improvement in the already exploited began in Europe.

After Millennium 1899/1900 Hungary began the introduction of chemical fertilizers, until World War II reaching a number of only a few kg · ha-1 of nitrogen, phosphorus and potassium. Due to numerous factors at that time, the amount of manure produced by cattle did not meet the nutrient needs of soil for agricultural production.

But this problem was overcome with the elaboration of a chemical fertilization schedule for use in agricultural production by Lang G., Bocz E., Győrffy B. This made it possible to introduce new hybrid crops in wheat and corn production, increasing its Yield and dynamic growth in the application of fertilizers. (Loch, 2015)

With the application of N of 60 to 70 kg/ha^{-1}, the use of fertilizers increased after 1995, while the use of P and K doubled and reached 60-70 kg/ha^{-1}. (Loch, 2015)

Use of N, P_2O_5 and K_2O fertilizers kg·há$^{-1}$ on agricultural land



Source: Agrochemistry and Soil Science 64 (2015)

The quality and level of nutrients in the soil rightly affect the quality of their performance. In many permanent agricultural lands, the soil is very poor in nutrients, and inefficient. However, producers, fight pests, fertilize the soil, irrigate and process agricultural activities to make the soil more efficient. (Asvini, 2018)

Increased agricultural production in food supply, forage fibers, biofuels is closely related to fertilizer.

According to the World Health Organization forecasts, it is expected that the world population had increased, but from nine million to the year 2050 surpassing the current population of 7.3 million, causing greater demand for food and feed. With an application of

viable and efficient fertilizer the production of crops can be increased, thereby expected an increase in the application of fertilizers globally.

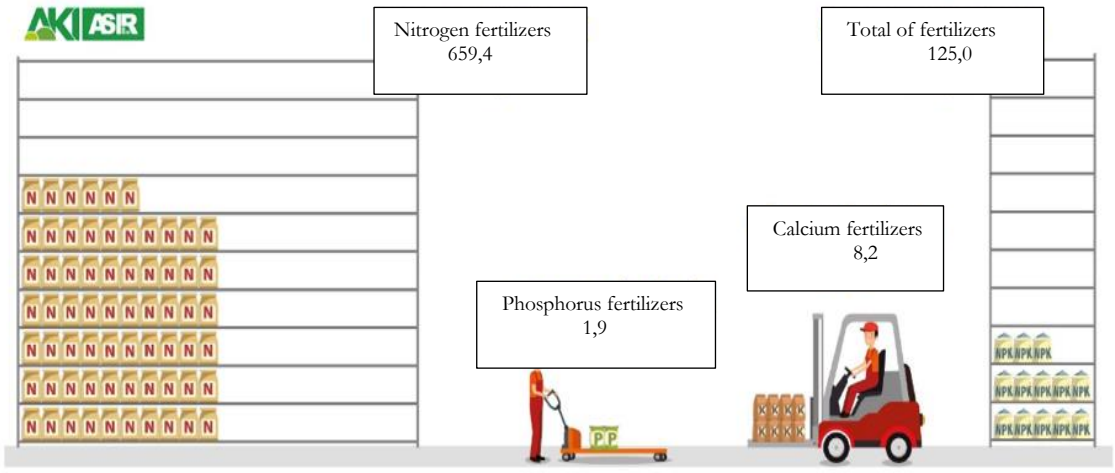
A 2015 FAO study, which says, according to FAO data, the application of fertilizers from the world was 185 million tons of effective matter in 2015. (Ács, 2018)

2.8. Evolution of fertilizer sales in the first half of 2022, thousand tons

In the first half of 2022 the agricultural producers bought the fertilizer distributors 795,000 tons. Its price increased three times, the amount sold was lower, was 29.6% compared to last year.

Because of this, a result of net revenue was obtained in the first semester 2022 of HUF 198.6 billion. Exceeding twice the result of the 2021 period. In the first half of 2022, 258 thousand tons of active ingredient, nitrogen, phosphorus, potassium by agricultural producers was obtained. Less than years earlier, being -30.6% less or 113.6 thousand tons. (Voronika, 2022)

Evolution of sales of fertilizers in natural weight in the first half of 2022 (one thousand tons)

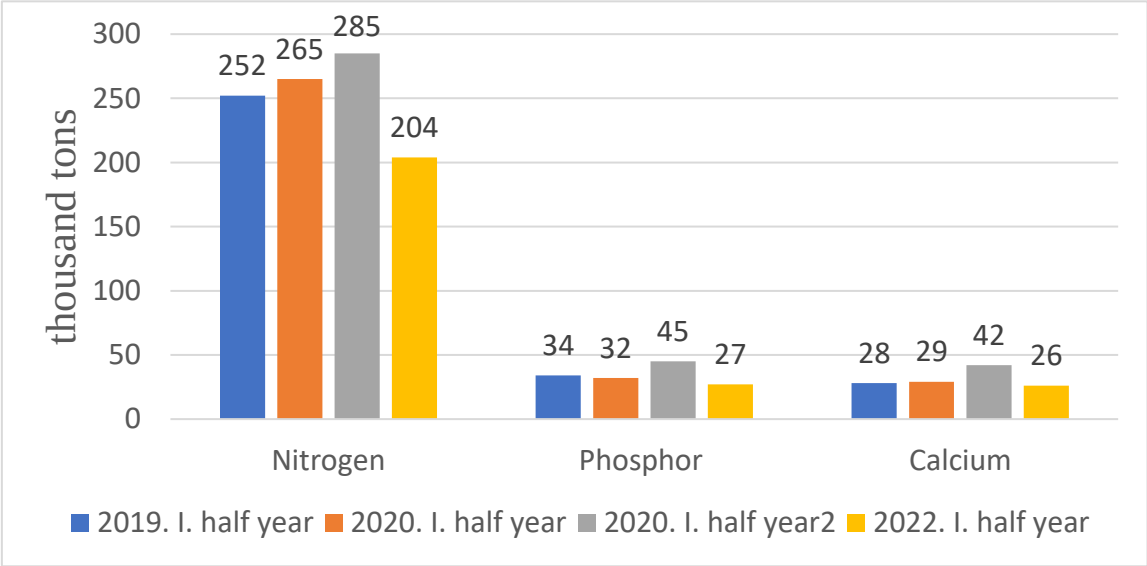


Source: Aki, Based on data collection

The active potassium substance had a lower content with 37.8%, active substance of phosphorus content with 38.7%, than in the base period, nitrogen decreased to a lower degree to 28.2 percent.

The NPK had a proportion of active substances in the first half of 2022 of 79:11:10, being smaller than the previous year with 77:12:11, noting a climb in 2022 in its proportion of active substance, having descended the proportion of potassium and phosphorus. (Voronika, 2022)

The fertilizer sold to farmers has a nitrogen, phosphorus and potassium content of the material per semester (2019-2022).



Source: Aki, Agricultural statistics

Current productive components have become significantly more expensive, with the largest increase in 195%of fertilizers. Fertilizer prices have been rising continuously since the end of 2020, growth -like growth in 2021 III. It started in the quarter. The price of nitrogen fertilizers increased more, costing almost 3.5 times more than a year ago. The increase in price is the effect of a large increase in the price of natural gas, which is used as a raw material for fertilizers

2.9. **Price trends in the first half of 2022**

According to KSH, agricultural producer price level increased by 40.3% and the price level of agricultural inputs 40.6% in the first half of 2022 compared to the same period of the previous year. The price for plant products produced 44.2% and the price of live animals and animals 31.5% compared to the first half of 2021. Among plant products, the price of cereals increased by 61.3% and that of industrial plants, 56.6%. The price to the potato producer was 20.7% higher than the base period level. Among the materials used directly in agricultural production, fertilizer prices rose on average just more than three times.

The price of animal feed increased significantly, at 38.9 percent. Among the materials tested, the seed price was 18.5% higher than the same period of the previous year. Among the fertilizers, the price of nitrosol 30% increased more, that is almost four and a half times, in the second quarter of 2022 compared to the same period of the previous year, the second quarter of 2021.

Current productive components have become significantly more expensive, with the largest increase in 195%of fertilizers. Fertilizer prices have been rising continuously since the end of 2020, growth -like growth in 2021 III. It started in the quarter. The price of nitrogen fertilizers increased more, costing almost 3.5 times more than a year ago. The increase in price is the effect of a large increase in the price of natural gas, which is used as a raw material for fertilizers

The price of fodder increased significantly, about 34%, including simple fodder by 43%and mixed fodder by 27%. Due to the increase in the price of raw materials, animal food prices in 2020 IV. The rise that began in the fourth quarter of 2021 continued, compared to the same period of 2021, the feed cost 13% more.

In agricultural investments, the price level of construction investments increased by 12% and the investments in machines, 7.1%.

As input prices rose more than producer prices, the value of agricultural scissors was 98.1% in the first quarter of 2022, between 105.3% in the same period of the previous year.

2.10. **Use of organic fertilizers**

Concept and definition of organic fertilizer

Organic fertilizers can be chemical composition with high analytical value that provide nutrients available for plant growth. Its contents can be derived from animal matter, composite plant matter and manure. Organic fertilizers are made with natural raw material.
Its compound is usually done by decomposing biodegradable waste, which can be, paper, leaves, remains of fruit peels and even fruit juices. They have good soil adherence causing the soil to achieve its ideal result.

Sources of organic fertilizers

Many of the main organic fertilizers had their origin of peat, animal waste from slaughterhouses, vegetable residues from agricultural production and sewage sludge. Some organic fertilizers are naturally such as peat, slurry and animal residues. They are based on carbon that greatly contributes to increased productivity and plant growth, they can also contain important micronutrients in organic fertilizers such as manure, powder rocks, such as lime, rock phosphate and green sand, bone flour, Wood and compound ash, improving soil quality.

Organic agriculture has always been a way of life because it is also a method of agriculture. Soil nutrient exhaustion and probable degradation have been considered serious threats to agricultural productivity and have been identified as the main causes of decreased crop performance and per capita food production.

Organic agriculture brings with positive effects on the environment and food quality, greatly contributing to the farmer to become self -sufficient in his needs of agricultural inputs and to reduce their costs. Organic agriculture aspires to a combination of organic, environmental, social and ethical goals. (Taddese and Arsi U. 2019)

Extracted powder limestone, Chilean rock phosphate and salt can be found in organic compounds rather than biological organs that can be energetically intensive at harvest. Many mineral fertilizers containing N, P, K and S not only increase crop performance, but also improve the nutritional quality of crop yields, such as protein, oil, starch, essential amino acids and vitamins in legumes, oilseeds, tubers and those vegetable.

Animal materials include the product of animal slaughtering, bone flour, leathers, hooves and horns were typically precursors, such as remaining parts of chicken, which consists of a medical -mixed chicken manure, was an organic fertilizer that showed better condition from soil to harvest than the fertilizers synthesized.

The common form of animal manure including corral or leakage manure of farm, corral manure also contains plant materials, often straw, which has been used as bed for animals that in turn absorb the urine. Liquid -shaped agricultural manure known as slurry is produced by more intensive cattle breeding systems, where concrete or salt is used instead of straw bed. The manure of different animals had different qualities and requires different application rates when used as fertilizer.

Sewage sludge is a material that contains human excrement, as it is generated after the mixture of water droppings and effluent treatment in the sewage treatment plant. Green fertilizers are cultures cultivated with the express purpose of drawing them up to increase fertility through the incorporation of nutrients and organic matter into the soil, improving root structure.

Green fertilization, whenever possible, is the main complementary feeding of the addition of organic matter to the soil. It consists of the cultivation of rapid growth crops and plowing to incorporate them into the ground. The decomposition of harvest residues, green fertilizer in previous years is always used as another source of fertility. (Taddese and Arsi U. 2019)

Nitrogen is necessary for the growth of vegetative parts, such as stems and leaves, causing plants to develop healthy roots, the same with the addition of a sufficient amount of phosphorus. Phosphorus contributes a lot to good flowers and fruits, potassium makes the plant healthy, facilitating the circulation of nutrients within the plant. In addition, plants also require other nutrients such as calcium and magnesium.

These same nutrients do not need to be added separately unless in exceptional cases, if the soil is fully devoid of these minerals or the culture you want to cultivate transform organic substrates into a stable material similar to humus. In addition to the carbon storage benefits of the addition of compound to agricultural soils, composting can lead to better soil quality, higher productivity and cost savings. For example, nutrients in the compound tend to promote soil fertility.

2.11. **Importance of organic fertilizer**

Organic fertilizers have always been different from chemical fertilizers, as materials were a byproduct of vegetables, animals or minerals, the decomposition matter of these sources decomposes naturally and would provide nutrients and minerals to the ground.

When considering the maintenance of the lawn, it was necessary to ensure that the lawn or garden received all the nutrients needed for the growth of healthy, although nutrients were

available in the regular soil, fertilizers can provide and ensure that the plant has a balance and access suitable nutrients.

One of the benefits of organic fertilizer was that nutrients were more slowly related than chemical fertilizers. This slower process allows the plant to process the fertilizer more naturally and will not result in excess fertilization, which in turn could damage the plant. Soil drainage and soil air circulation can also be improved. Having a pile of composting was also a great way to stop the waste of food and contribute to the care of agricultural production and the environment.

Usually many chemical fertilizers contain chemicals that are not easily biodegradable. These chemicals are leached in the soil and eventually reach the water system, where they are consumed by birds and other animals. In contrast, organic fertilizers do not have these harmful compounds and therefore do not represent this danger, even with increasing use.

In addition, when synthetic fertilizers are sprayed in agricultural crops and lawns, they pose an immediate danger to local communities, and pets that play or pass near these same areas. Caution should be taken when using these toxins and exposure should be limited. Unlike chemical fertilizers, organic fertilizers reduce soil acidity and do not cause leaching. They do not kill beneficial microorganisms on the soil. Organic fertilizers also help improve soil structure, including air circulation, which supports beneficial microorganisms that help release nutrients to the ground.

2.12. **Development of the number of animals in Hungary**

Livestock production volume fell by 1.3% caused by the drop-in living animals. The economic conjuncture caused by the COVID-19 epidemic impaired the situation of cattle breeders, and the sanitary emergencies of animals due to African pork plague and avian flu. The number of animal products produced exceeded 2019 by 1.3%, cattle production increased by 1.0%, swine 1.0%and 5.0%birds, while the other main animal species not changed compared to the previous year. Milk production, which represents a significant weight, increased by 2.0% in the same year. (József et al., 2012)

In agriculture, the volume of current productive consumption necessary for the production of products and the provision of services increased by 0.9% over the previous year. The yield of production factors was 11% higher than the previous year, and the business income was 17% higher.

In the year 2020, the use of agricultural labor, expressed in annual labor units, decreased 5.9%. The use of full -time labor, 1,800 hours of work per year, corresponded to the agricultural activity of almost 338,000 people. Indicator used to measure the variation of agricultural income, the actual yield of production factors per unit of work, the indicator increased 12% in 2020 and, since 2010 except 2012 and 2015 every year exceeded the previous year. Between the EU member states, Ireland, Croatia and Spain had a greater growth than Hungary.

2.13. **Analysis of the causes of the economic crisis**

Prices for agricultural producers increased 34% in the first quarter of 2022, mainly as a result of the 38% increase in the price of plant products. The price of animals and animal

products increased by 24%. Although investments and components for production became significantly more expensive, input prices were 37% higher, mainly due to the increase in fertilizer prices 195% and natural gas used as raw material. www.ksh.hu

Factors resulting from increased prices

The high price increase in the past period was caused by a combination of several factors. The disorder between supply and demand caused by the COVID-19 epidemic did not completely disappear, and energy prices also increased in parallel to economic recovery. Problems within the agricultural sector, especially animal health, also increased the increase in prices. The war between Russia and the Ukrainian recently brought a strong increase in food and energy price and settling the general uncertainty to the world market, which significantly increased the price of inputs and demand.

Wheat and corn prices

Cereal and oilseed prices increased dynamically, 54% and 61% respectively. In addition to the increase in price are the strong international demand for forage and the transport problems caused by war.

The volume of gross domestic product (GDP) decreased 6.8% in the first quarter of 2020 at the beginning of the pandemic in China, breaking the climb that had lasted several decades. After that, as a result of raising the restrictions of February and January, the economic performance of the Asian country increased again, so that by 2020 exceeded the previous year by 2.3% in total.

At the annual level, the production of goods producing branches increased, with the highest weight of the transforming industry by 2.3%. Most branches of service have also increased, but accommodation, hotel, commerce and business services have won the expansion of GDP volume.

Regarding the agricultural sector, prices of agricultural production in 2020 were 1.0% higher than in 2019. The 8.7% drop in fertilizer prices was influenced by the drop in the first half of 2019 in natural gas prices and gross oil, which serve as raw material and exploded again due to the war between Russia and Ukraine. The high of low ration prices characteristic of the end of 2019, from the beginning of 2020.

One of the least affected economic areas by the COVID-19 epidemic was agriculture, whose added value was 6.8% lower than the previous year, thus contributing 0.2 percentage points to 5.0% of GDP volume decrease.

Agriculture produced 4.1% of the gross added value of the national economy. 4.3% of investments, HUF 464 billion, were spent on agricultural developments, a value 6.9% in real terms than in the previous year. Investments showed a recovery in the first trimester, but the epidemic caused by coronaviruses decrease it in the second quarter. From the fourth quarter, it broke the momentum of developments since 2017. 4.6% of the acupados12 or 213,900 people worked in the agricultural sector, almost three rooms of them had husbands.

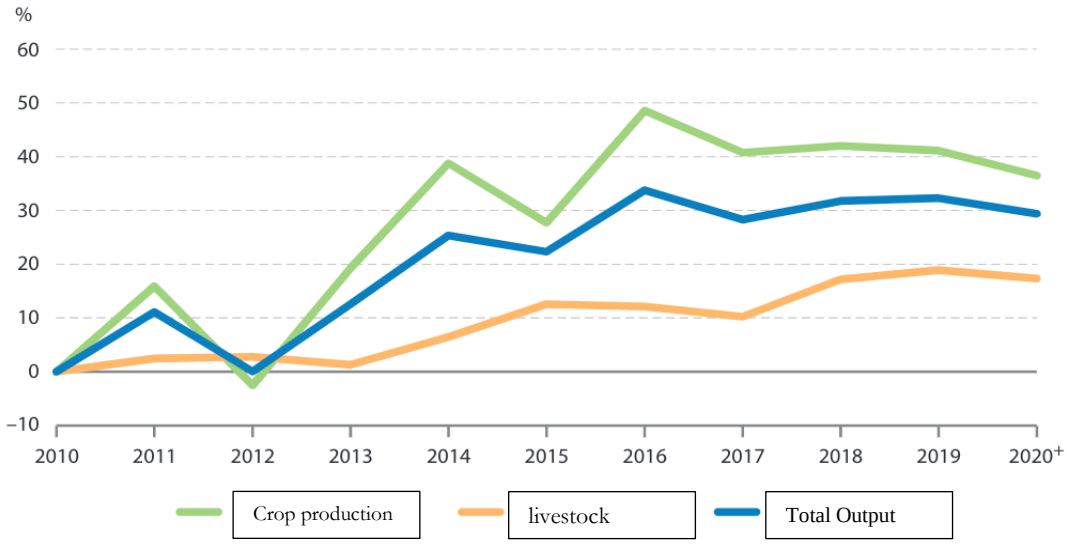
The total number of employees increased by about 1,200 people in a year. The average monthly gross income of employees increased by 9.2% to 320,000 HUF compared to the

previous year. The wage departure was lower than the national economic average, so the average salary in agriculture was still significantly at 21% below the national average.

Increased prices, increased value of agricultural production

Since 2014, agricultural production has ranged at a higher level than the previous period. According to preliminary data from the agricultural account system, by 2020 the volume of total agriculture production was 2.2% lower than the previous year, while agricultural prices increased by average 7.2%. (KSH, 2021)

Variations in the volume of agricultural production (compared to 2010)



Source: Hungary Central Statistics Office (KSH, 2020)

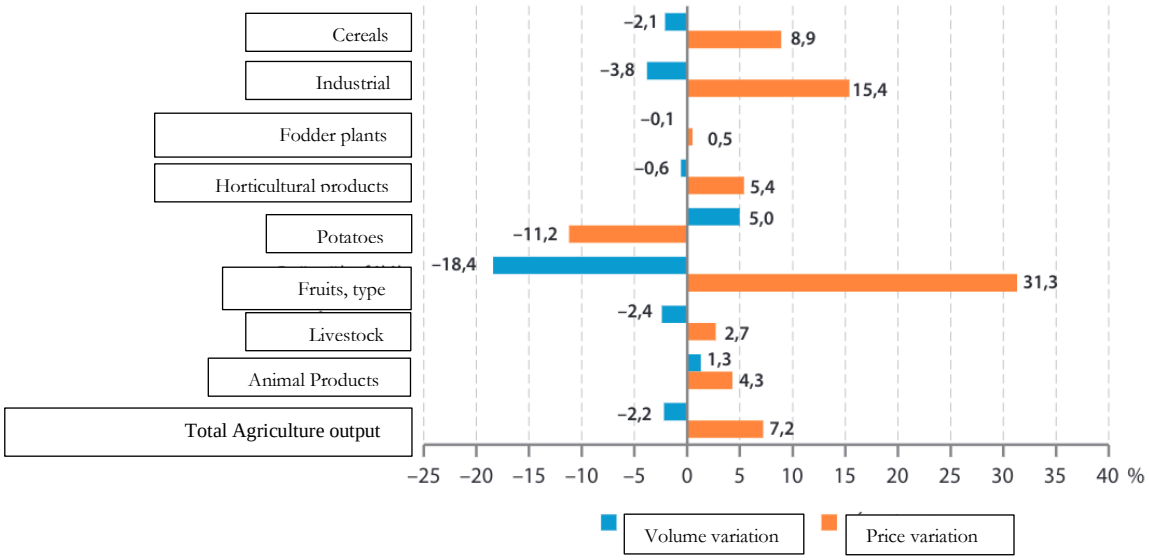
As a result of the change in volume and price, the value of agricultural production of 2.973 billion HUF, including services and secondary activities, increased by 4.8%. Agricultural cultivation accounted for 58% of total production, animals for 34%, and the rest came from services and secondary activities. The proportion of main activities has not changed significantly in recent years. Due to the effects of adverse weather problems, crop production volume decreased 3.3%, while the price curve increased by 10%.

As a result of the change in volume and price, the value of agricultural production of 2.973 billion HUF was also included services and secondary activities, increasing its value by 4.8%. Of total production, agricultural cultivation accounted for 58%, the breeding of animals by 34%, the remaining derivative of services and secondary activities. The proportion of main activities has not changed significantly in recent years.

Combined production of corn ears was 2.1% lower compared to the high base of 2019, among the main grains, wheat production decreased 7.0%, corn increased 1.3% and barley 3, 6%. The volume of industrial plants has shrunk to 3.8%, within which not only the oilseeds that make up the majority of the plant group, but also the protected ones cultivated in smaller areas.

The production of forage crops did not change significantly, that of sugar beets decreased compared to 2019 due to the decline of production. Fruit production was significantly reduced by damage to the flowers and buttons caused by spring frosts, the loss affected all the most important fruit species. The number of grapes was 8.0% lower than the previous year, but at the same time, based on the quality of the wine.

Volume and price variation compared to the previous year based on the agricultural invoice system, 2020



Source: Hungary Central Statistics Office (KSH, 2020)

According to preliminary data, the total agricultural production of the European Union by 2020 was 412 billion euros at basic prices, decreased by 1.4% over the previous year. Agricultural production represents a little more than half of emissions, 1.2%, livestock, which represents almost four tenths, decreased 1.5%. By 2020, Hungary produced 2.1% of the value of EU's agricultural production, its participation has not changed significantly in the last ten years. 11% of the value of corn production and 9.7% of oilseed production were produced in Hungary, occupying the 4th place in the EU ranking. Among the main breeding animals, participation in community production was the largest (4.4%) in the case of birds. (Ksh, 2021.)

2.14. **Average corn yield**

With the end of spring drought, the large amount of precipitation that fell several times during the summer affected the performance of the main arvens cultures in different ways. The yield of barley and corn was higher than in 2019, oats were the same and other field cultures were smaller than the previous year. 4.5% less grains in a total of 6.9 million tons, were harvested at 5.6% fewer arable land than the previous year. The wheat accounted for 73% of the summer crop and the barley by 21%. Among corn producers, the average yield of wheat and triticale was higher than the previous year. Corn yield cultivated in the largest area per hectare approached the 2016 record.

Despite the increase in its area, the production of sunflower and colza, which play a significant role in the production of arvenses cultures, their value descended comparing, with the previous year. The yield by hectare of the two oilseeds was almost the same 2.8 tons.

Animals for slaughter and products of animal origin

In December 2020, among the main farm animals, for the rebate, pigs and chickens and fewer sheep were cattle than the previous year. In 2020, the expansion of the cattle herd since December 2010 continued. In the early winter, farmers took over 24,000 head of cattle more than in early December 2019, the number measured at the end of the year was the last in 1993. The number of cows, representing 44% of the total herd, increased by 2,000 in a year. By 2020, 23.9 thousand tons of cattle were purchased, about 1.6 million tons of cow's milk received from producers for processing in a percentage of 2.7% higher than the previous year.

The pig herd increased by 8.2% in one year, and the number of nuts, which represented 5.7% of the number, increased more moderately than last year, 5.4%. During the year, the number of slaughtering pigs purchased from producers, 435,000 tons without slaughter swine and piglets, did not change significantly compared to the previous year, its average weight was almost the same as 2019, 117 pounds. In 2010, the sheep population was 1.1 to 1.2 million and, by 2020, the number of sheep decreased to less than 1 million. About 6,200 tons of slaughter sheep were seized during the year, 11% less than in 2019. The number of chickens kept by breeders who reached the size of the farm increased by 2.6%, but the number of eggs increased, which represent three tenths of the total number, decreased 3.3%. By 2020, 7.8% more cuts were purchased, 428,000 tons than in the previous year and 0.4% fewer edible chicken eggs 277 million pieces.

2.15. **Increased property concentration in agriculture**

According to the preliminary results of the 2020 Agricultural Census, the number of farms that perform agricultural activity of 234 thousand, decreased one third compared to 2010. 67% of farms were dedicated to crop, 25% to livestock and 9% performed both activities. Of the 4.8 million hectares of agricultural lands, half of which they were leased by farmers, 82% were arable land. Over ten years, the concentration of land has increased in all branches of cultivation, but especially in the case of orchards. The cattle herd was 31% higher than in 2010, while the other main livestock species were smaller. Half managers are at least 40 years old and cultivate based on their practical knowledge. Farmers employed 214,000 employees, 45% of them in a prosecution. (Ksh, 2021.)

In companies that employ at least 5 people, in budgetary institutions and in non -profit organizations that are significant in terms of employment.

3. MATERIALS AND METHODS

3.1. Concept and definition of fertilizers

It is necessary to explain what it means that fertilizers are plants need some mineral nutrients to survive. We can find these miners naturally in the soil and are absorbed from the soil by the roots of the plants. Many soils already have enough miners to keep plants healthy, however, some nutrients are partially consumed by plants, or even were washed from the ground and need to be replaced to maintain the ideal growth and yield. These same most common mineral nutrients that need to be replaced are nitrogen, phosphorus and potassium (NPK). (Balu, 2020)

Fertilizers result from a mixture of manufactured chemicals that contain N, P, K, K and other necessary nutrients. They are introduced to the ground to replenish the soil with the proper amount of these nutrients. In their packaging or bag, they even have three numbers in front of the fertilizer bag, which represent the percentage by weight of N, P and K in that specific mixture. These same numbers are used to calculate how much of a particular fertilizer should be applied at once. (Balu, 2020)

3.2. Choice of Research Location

The research was conducted in the city of Kosovar, in the province of Somogy Megy, was chosen because of its long agricultural history, a region with several small, medium and large farms, whose agricultural practices are made at all times of Year, the use of fertilizer in Hungarian agriculture was analyzed in general through literary analysis.

3.3. The questionnaire and report

Several methods for collecting data related to the topic of this research is available. These include research, the use of focal groups, as the main collection of DOS was the interview in three major farms in the Somogy Megy region in October 2022, use of secondary data. Recognizing that none of these approaches are perfect.

3.4. Statistical methods

A combination of quantitative, qualitative and analytical methods was used to analyze research responses. Many direct citations appear throughout this document, chosen by the author to make a specific point. The quantitative methods used are described in more detail in this section of results.

4. RESEARCH RESULTS AND THEIR ASSESSMENT

As a result of my thesis, the types of results were primary through a report, made by interviewing in three large farms in the Somogye Megy region, and the secondary result through a literary analysis.

4.1. **Primary results data: First – Farm!**

The first farm in which I made the report today they have 1,400 hectares and one of the characteristics of the topic is that they have over 500 dairy cattle, which in turn provide organic fertilizers in quantities, capable of replacing artificial fertilizers in significant quantities. During the report, they were in a good position like, the leader of agricultural production.

During the interview, according to the owner, it was said that 1400 hectares were manufactured in 22-25 gold wreaths, predominantly extra sour soils, causing a problem with nutrient excavation. Since soil sampling was not representative, they were mainly based on literary data in the case of soil redefinition. In practice, this meant that the requirement of tone nutrients was calculated during fertilization. In the case by hectare. In the case of stable manure (9 to 10,000 tons of straw fertilizer, 60-80 thousand cubic meters of paste). For potassium and phosphorus, they are not replaced in organic fertilized areas. According to the owner the current goal is to take at least 80%of the project of previous fertilizers.

The table is constantly seen and where there is a chance to get a higher yield, they give 100% and where a more moderate harvest looks, but or less. The supply of fertilizers is impressive, so others have just acquired the needs of spring and, in the case of cultures, in spring, the strategy will be established next year, knowing the current situation. Due to the drought, less corn was calculated, with a total of 40 hectares of corn, for clean corn with an average of 7 tons, and the harvest was very toxic this year. Production costs have practically doubled, especially in the obtaining of nutrients, sales also increased, with current revenue of about 300,000 HUF per hectare.

Another new element is planned to be introduced and plants are being fed through their leaves, greatly contributing to the reduction of applied matter, giving the result of the best use. An increase in soil management was also planned, which emphasizes better use of organic matter in the soil. This is planned to save 50-60 kg of nitrogen per hectare. This movement is economically justified, as the cost per hectare is approximately 10,000 HUF and the same amount of nitrogen fertilizer is 80 thousand HUF.

4.2. **Data: Second – Farm!**

The second farm has the cultivation of 750 hectares so far in Somogy County, with another 250 hectares totaling 1000 hectares. They deal mainly with agricultural production and prefer some animals (horse, donkey, goats, sheep, beef). The vast majority of the area is complemented with some forests and meadows. Animals have some organic fertilizers due to the number reducing animals, they do not provide significant amounts of fertilizers, leading to other strategies such as bacterial fertilization.

The fertilizer was always purchased in summer when it was a little cheaper. The fertilizer has been bought so far through the kite because they were able to buy very good conditions. This meant it could be ordered with a 2-3%share, zero.
Today, this situation has changed and now 20% of the fertilizer should be paid for, 20% are being charged at the time of delivery and the remaining amount is eliminated by some percentage. They are now as a plan to advance toward bacterial fertilizers as a new method.

Now they are focusing on this procedure and relying on more efficient use. Its lands are 24-28 gold wreaths, relatively good. Plants are thrown into a large spectrum, with more than ten species annually. For some plant species, they do not provide so many active ingredients (eg beer barley) to maintain quality. In the case of fertilizer, more price increases are calculated. They try to look around the market and buy a cheaper opportunity from there. There is a plan to cultivate precision agriculture, with approximately the machine fleet available. This has been done so far, but they were not satisfied with the work provided by service providers. For example, develop performance maps and chemical maps by a service provider.

4.3. **Data: Third – Farm!**

The third farm is also located in Somogy County. They manage 600 hectares, of which about 60 hectares are installed.
Drought did not severely affect the area they cultivated, due to agrotechnology used in previous times, left for precision agriculture, but cannot achieve the best results.

They have a cultivation of sunflower, corn, wheat, barley, soy, oats, grains. The average value of the soils is weak 7 gold wreaths. In normal years, 9 to 10 tons of corn, 6-8 tons of wheat and sunflower in three tons were capable of being brought. As for the fertilization strategy they are now changing to liquid fertilizers, expecting absorption to become more effective.

An additional change is to use a higher proportion of leaf fertilization, which also expects more effective absorption. Instead, they fertilize the stem, which will expect efficiency to increase. They also think of soil improvement, which should also improve efficiency. They do not want to bring organic matter in the area because the content of humus in the area is very low.

It also has the use of green fertilization. The fertilizer market also featured players that were not previously reported and new channels were opened.

4.4. **Data from secondary results**

As data from secondary results it was obtained that the price of the world natural gas market increased more than double, and slightly reducing very minimal percentages. Parallel to the price of gas, the production of fertilizers in large factories decreases it, some reaching the cancellation of their productions. Market panic is enhanced by uncertainty about the reboot of the North Current, and in turn, the euro and Forint have been devalued phase to the dollar.

All of these changes have made energy purchase and fertilizers very expensive, in the sagging of the accumulation of shares and prices.

At the same time, different processes are also in the global market. High prices affected major buyers and importers such as India, for example, who recently expected a million tons of urea, but competed for them by half a million. The manufactured fertilizer is accumulating in warehouses, but is increasingly expensive for end users.

In Germany, ammonium calcium Nitrate are around € 747, per ton (297 thousand HUF), asking € 100 more than in early July. Urea costs more than 900 euros ($ 358,000) per ton, rising 65 euros since the beginning of the month. For potassium nitrate, German farmers now need to cost € 640 (254 thousand HUF) per ton. For phosphates (DAP), sellers are asking almost € 1130 the equivalent with (449 thousand HUF).

According to a Russian newspaper the situation in the global fertilizer market could deteriorate further, the same newspaper said the Russian government was planning to raise tasks in fertilizer exports. The Russian government expects to enter the state budget 100 billion rubles (about 1.75 billion euros) per year.

Russia recorded a budget deficit of almost 6 billion euros in August, due to a sharp decline in gas and oil revenue. There were restrictions on nitrogen fertilizer exports, from spring in the form of export quotas. To a negotiation with several governments, the Russian government and especially with Eos - Soviet states and China, looks in an attempt at the sanctions of I exclude Russian goods, so that up to 8.3 million tons of nitrogen fertilizers and 5, 9 million tons of compound fertilizers are released.

5. CONCLUSIONS, SUGGETIONS

It concluded that the agricultural business due to its rich production has always aimed to meet the needs of the population, and Hungary is a country with extremely favorable natural resources in terms of agricultural production, has been cultivating its land, a thousand years and to achieve this Result The application of fertilizers has been the most important substitution of soil force, whose drastic price increase has created a new situation in Hungarian and global agriculture.

Regarding the panorama of Hungarian agriculture in the Somogy Megy region where the results were done for some farmers, it was noted that due to the decreasing number of animals, it was not possible to apply the large-scale organic fertilizer or as replacement of fertilizers. Artificial, the use of organic manure is only possible on some farms, such farms with higher cattle number, so most farmers do not want to give up the highest yields of culture cultivation, bringing them the application of new strategies and Fertilization methods, such as bacterial, green, organic fertilization, new methods such as precision agriculture, the use of previously unused technologies, greater and better soil management, minimization of the amount of organic matter, higher fertilization project, with greater accuracy, reduction of losses through fertilization through leaves or near the stem, new fertilizer purchasing channels , reduction of areas cultivated for species that can endanger production yield, for example, drought in the case of corn crop.

It was noted that in a global sense, a negotiation or revision of the sanctions applied between various governments, can change the current situation of the fertilizer market, such as the inclusion of Russian goods, so that it is possible to release 8.3 million tons. of nitrogen fertilizers and 5.9 million tons of compound fertilizers, this time the Agricultural Sector Conference, which took place in November 2022 in the European Parliament, was out of the European Union's Common Agricultural Policy for 2023, and it is not sufficient I need to act better productivity, dialogue, diplomatic agreements, effectiveness and healthy competitiveness of agricultural activities.

Nitrogen fertilizers are based, the natural gas therefore the climb of its price has had a negative impact on large and media fertilizer industries, making many companies reduce their production, others even stopping their production and how Consequence The increased risk of global food scarcity, Russia is a very important element in the global fertilizer production and distribution sector due to sanctions, war with Ukraine, fertilizer exports were stopped.

In recent years Hungary has developed its agricultural sector greatly, unfortunately it has been currently noticing some casualties, according to the preliminary results of the 2020 Agricultural Census, the number of farms that perform agricultural activity of 234 thousand, decreased one third in relation to 2010. 67% of farms were dedicated to crop, 25% to livestock and 9% performed both activities. Of the 4.8 million hectares of agricultural lands, half of which they were leased by farmers, 82% were arable land. Over ten years, the concentration of land has increased in all branches of cultivation, but especially in the case of orchards. The cattle herd was 31% higher than in 2010, while the other main livestock species were smaller. Half managers are at least 40 years old and cultivate based on their practical knowledge. Farmers employed 214,000 employees, 45% of them in a prosecution.

Still on the Hungarian agricultural panorama, agriculture produced 4.1% of the gross added value of the national economy. 4.3% of investments, HUF 464 billion, were spent on

agricultural developments, a value 6.9% in real terms than in the previous year. Investments showed a recovery in the first trimester, but the epidemic caused by coronaviruses decrease it in the second quarter. From the fourth quarter, it broke the momentum of developments since 2017. 4.6% of acupados12 or 213,900 people worked in the agricultural sector.

As a result of the change in volume and price, the value of agricultural production of 2.973 billion HUF, including services and secondary activities, increased by 4.8%. Agricultural cultivation accounted for 58% of total production, animals for 34%, and the rest came from services and secondary activities. The proportion of main activities has not changed significantly in recent years. Due to the effects of adverse weather problems, crop production volume decreased 3.3%, while the price curve increased by 10%.

Finally, increased prices mainly affected nitrogen -based fertilizers, increasing demand for fertilizers such as; Calcium and Nitrosol ammonium nitrate, together they accounted for 88% of fertilizer sales in March. Meanwhile, these products were 2-3.5 times with higher prices than in March 2021. Fertilizer prices is not a new phenomenon, despite the changes that have been recently operating in the market since the fall of 2021, prices have increased Constantly, which led to the conclusion that this could affect this year's agricultural production.

6. SUMMARY

However, the latest events, whether local or global, have changed the percentage digits of fertilizer prices both organic and artificial, increasing the cost of production in the agricultural sector, with the main factor of these changes and changes to obtain natural gas, the conflict between Russia and Ukraine, especially the sanctions given to Russia by the European Union.
However, regarding the agricultural sector, improve productivity, healthy competitiveness of agricultural activities, in the political and economic sector, dialogue and diplomatic agreements can respond to these challenges. Production of large - scale agricultural products, rational use of available fertilizers are some important possibilities for Hungary to face challenges.

However, the competitiveness in the domestic market the scarcity of products, price variation calls for optimized in the rational use of available resources. Thus, achieving an economic yield in agribusiness, qualitative and quantitative, ecological and sustainable, are potential results of the low level of prices, difficult acquisition, high production costs of fertilizers in large industries, which in turn decreased production and affected in the development of agribusiness, decreased cattle, pigs, sheep due to the scarcity of pasture production, factors that contribute to the decrease in production of organic fertilizers.

The report given by three local farmers, through an interview, among them the first face to this problem of obtaining artificial fertilizers, can cover with application of the use of organic fertilizers in an area of 1400 hectares, due to sufficient amount of cattle Milk cattle, present on your farm, being a total greater than 500 heads, had high production costs, especially in obtaining nutrients, sales also increased, with current revenue of about 300 thousand HUF per hectare.

Reduce their applied matter through new methods and plant feeding by their leaf, thereby get the best use of their resources. An increase in soil management, which emphasizes better use of organic matter in the soil. Reduction of 50-60 kg of nitrogen per hectare.
For the second farm the vast majority of the area is complemented with some forests and meadows. Animals produce some organic fertilizers, but not enough due to the number reducing animals, obtaining other strategies such as bacterial fertilization. A crop in 750 hectares with another 250 hectares totaling 1000 hectares. Main focus on agricultural production and few animals such as (horse, donkey, goats, sheep, beef). They always acquired fertilizers in summer at cheap prices.

The situation has changed and 20% of the fertilizer should be paid for, 20% are being charged at the time of delivery and the remaining amount is eliminated by some percentage. New method such as advancing toward bacterial fertilizers, precision agriculture, with approximately the machine fleet available.

The third owner left for precision agriculture, but still cannot achieve the best results. They have a cultivation of sunflower, corn, wheat, barley, soy, oats, grains. They manage 600 hectares, of which about 60 hectares are installed, an average value of weak soils 7 golden crowns. In normal years, 9 to 10 tons of corn, 6-8 tons of wheat and sunflower in three tons. As a fertilization strategy, liquid fertilizers, expecting absorption to become more effective. Use in a higher proportion of leaf fertilization, with more effective absorption, soil improvement, which should also improve the efficiency and use of green fertilization.

World Natural Gas Market Price increased more than double, in parallel to gas price, the production of fertilizers in large factories decreases it, these changes made the purchase of energy and fertilizers very expensive.

At the same time, different processes are also in the global market, large buyers and importers have been affected, such as India, Germany, among others. India expected a million tons of urea, but competed for them by half a million, accumulating from the fertilizer manufactured in warehouses, and those increasingly expensive to end users, however Germany rising ammonia, calcium, nitrate. The sellers are asking 449 thousand HUF per ton.

The situation in the global fertilizer market can deteriorate further, as one of the solutions the European parliament in a conference of the agricultural sector, was out of the European Union's new agricultural policy for 2023, negotiation with various governments, the Russian government, AS - Soviet states and China, so that the sanctions of the EU markets exclude Russian goods for the release of 8.3 million tons of nitrogen fertilizers and 5.9 million tons of compound fertilizers.

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8. MELLÉKLET

NYILATKOZAT

Alulírott João Albino Quibuila Manuel, a Magyar Agrár- és Élettudományi Egyetem, KaposváriCampus, Mezőgazdasági mérnök szak nappali/levelező* tagozat végzős hallgatója nyilatkozom, hogy a dolgozat saját munkám, melynek elkészítése során a felhasznált irodalmat korrekt módon, a jogi és etikai szabályok betartásával kezeltem. Hozzájárulok ahhoz, hogy Záródolgozatom/Szakdolgozatom/Diplomadolgozatom egyoldalas összefoglalója felkerüljön az Egyetem honlapjára és hogy a digitális verzióban (pdf formátumban) leadott dolgozatom elérhető legyen a témát vezető Tanszéken/Intézetben, illetve az Egyetem központi nyilvántartásában, a jogi és etikai szabályok teljes körű betartása mellett.
A dolgozat állam- vagy szolgálati titkot tartalmaz: igen **nem***

Kelt: Kaposvár, 2022. november 2.

Hallgató

NYILATKOZAT

A dolgozat készítőjének konzulense nyilatkozom arról, hogy a Záródolgozatot/Szakdolgozatot/Diplomadolgozatot áttekintettem, a hallgatót az irodalmi források korrekt kezelésének követelményeiről, jogi és etikai szabályairól tájékoztattam.

A Záródolgozatot/Szakdolgozatot/Diplomadolgozatot záróvizsgán történő védésre javaslom / nem javaslom*.
A dolgozat állam- vagy szolgálati titkot tartalmaz: igen **nem***

Kelt: Kaposvár, 2022. november 2.

Belső konzulens