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«*Fertilizer subsidies in Kazakhstan: efficiency assessment in the agricultural sector*»

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FERTILIZER SUBSIDIES IN KAZAKHSTAN:

EFFICIENCY ASSESSMENT IN THE AGRICULTURAL SECTOR

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Abstract

In the Message of the First President of the Republic of Kazakhstan N. Nazarbayev dated January 10, 2018, it was said: “smart technologies " is a chance for a breakthrough in the development of the agro-industrial complex. Multiple increases in yield can be achieved through a set of measures, one of which is the effective application of mineral fertilizers. In this work, I made the analysis of agriculture sector using financial instruments. The main question of research is *Will the productivity of the agro-industrial complex in Kazakhstan increase with increased government support for fertilizer subsidies?* The study focuses on reviewing existing programs and policies in the field of cost of fertilizer subsidies in Kazakhstan.

The purpose of the study is to review the timing of implementation of subsidy programs, budget details and the progress of their implementation based on the collection of secondary information available in the Ministry of Agriculture and Ministry of Finance of Republic of Kazakhstan.

The object the process of subsidizing fertilizers and the effectiveness of allocated funds from the budget.

The practical importance of work is that the main results of the study can be used to internal analysis of the budget efficiency of the Ministry of Finance of the Republic of Kazakhstan and improve the work of subsidy control of the Ministry of agriculture of the Republic of Kazakhstan.

Publications on a work subject:

1) F.Nailkyzy «Fertilizer subsidies in Kazakhstan: efficiency assessment in the agricultural sector», planned publish on the website of the scientific electronic library eLIBRARY.RU

Structure and volume of the thesis: The thesis consists of introduction, 6 chapters, including the conclusion, the list used sources and annexes.

The text of the master thesis includes 19 diagrams, 4 tables, 4 maps

Key words: Fertilizer subsidy, budget efficiency, Kazakhstan agrarian cases, agricultural productivity, mineral fertilizers, fertilizer subsidy program, fertilizer use.

1.Introduction

Preface

Annually the population of the planet increases by about 78 million people. And one of the global problems of mankind is to provide it with food. The earth is the main source of our food. But it is depleted every year, because we do not saturate it with the necessary active ingredients. The solution in the effective cultivation of crops. And efficiency, in turn, is ensured by introducing new technologies, ways of organizing labor and developing the agro-chemistry sector. One of the factors affecting the growth of crop production is soil fertility. As a result, the main task of many countries is to improve soil fertility. For plant growth are needed: water, light and nutrients that are in the soil, but often these nutrients are not enough and require the use of different types of "additional feedings" - mineral fertilizers. Kazakhstan now provides assistance to farmers so that this problem does not become a problem in the future. This is subsidizing mineral fertilizers. The subsidy comes at the expense of the budget with billions tenge every year. The study focuses on reviewing existing programs and policies in the field of cost of fertilizer subsidies in Kazakhstan. The global introduction of agricultural chemicals has led to the formation of a powerful international industry for the production of mineral fertilizers, a wide network of logistics and distribution. According to the International Association of fertilizer producers, in comparison with the 60s of the last century, the world consumption of mineral fertilizers in 2018 increased almost 10 times. The Agro-chemistry market is currently one of the most monopolized. Agriculture in Kazakhstan remains a small sector of the economy of Kazakhstan. The contribution of agriculture to GDP is less than 10 % - it was registered as 6,7%, and took only 14 % of the labor force. At the same time, more than 70% of the country's land is occupied in crop production and animal husbandry. Kazakhstan predominantly is an agricultural country with more than 17 thousand registered agricultural firms and uncountable number of farmer household.

Analytical publications, and other open sources of information were used as sources of information.

Sources of information:

- Publications of the Statistics Committee of the Ministry of National Economy of the Republic of Kazakhstan;
- Government documents of Agricultural development programs. Most of the valuable information taken from these documents;
- Informational, analytical and expert materials placed in specialized publications, the media and the Internet;
- Official press releases and analytical materials of industry associations, etc .;
- Other sources.

This research paper describes the methodology for assessing the effectiveness of subsidies, examines the system of state support for agriculture in the Republic of Kazakhstan and attempts to assess its effectiveness.

1.1 Fertilizers: definition, classification and application

Classification of mineral fertilizers and what is it needed for?

The invention in 1909 by Fritz Garber and Karl Bosch of the process of synthesizing ammonia, which initiated the industrial production of nitrogen fertilizers, the founder of the World Economic Forum, Klaus Schwabb, was included among the key events of the second industrial revolution. Mineral fertilizers are industrial or fossil products, which contain the elements required for plant nutrition and increase soil fertility. They are obtained from mineral substances by mechanical or chemical processing. The nutrients in mineral fertilizers are mainly presented in the form of mineral salts, but there are also organic compounds, in particular urea.

The use of organic or mineral fertilizers by owners of gardens and farms increases the yield of cultivated plant species. Preparations are used to improve the composition of the soil.

Organic fertilizers are fertilizers that contain plant nutrition elements primarily in the form of organic compounds.

Mineral fertilizers are inorganic compounds that contain the necessary nutrients for plants in the form of various mineral salts. The use of mineral fertilizers is one of the main methods of intensive farming. In this study, the focus is on mineral or chemical fertilizers, so all further analysis will be provided only for this category of fertilizers. There are two types of mineral fertilizers:

- simple-single-component;
- complex-consisting of two or more ingredients.

The introduction of a complex of useful additives significantly increases the guarantee of future harvest. This is due to the different properties of the soil, the presence of necessary nutrients in it.

In general, the active use of fertilizers began in the world in the XIX century. Thanks to the work of the German scientist Julius von Liebig, who discovered that plants need nitrogen, phosphorus and potassium to feed.

Forms of simple mineral fertilizers are as follows:

1) Nitrogen-fertilizers contain the main active substance-nitrogen. Adding products increases its content on the site, which causes rapid development of culture. Their production is based on the production of synthetic ammonia from molecular nitrogen of air and hydrogen. The source of hydrogen is natural gas, coke oven and petroleum gases. This process requires significant energy consumption. The production of 1 ton of nitrogen consumes energy equivalent to processing 4 tons of oil. Currently, the industry produces nitrogen fertilizers in the following forms:

- ammonia - fertilizers containing nitrogen in the form of an ammonia group;
- nitrate - fertilizers containing nitrogen in the form of a nitrate group;
- ammonium nitrate - fertilizers containing nitrogen in both nitrate and ammonia forms at the same time;
- amide - fertilizers containing nitrogen in the amide form of an organic compound of urea (urea or urea);
- liquid nitrogen fertilizers - fertilizers containing nitrogen and are in the liquid state of aggregation (ammonia water, anhydrous ammonia, UAN).

2) Potassium-mineral fertilizers are used at the very end of the period of culture development. They increase disease resistance and improve the taste of crops. Raw materials for the production of this group of fertilizers are natural potash salts. Phosphorous-mineral products accelerate the flowering of crops. Potash fertilizers are divided into raw potash salts and concentrated potash fertilizers.

- Crude potash salts are obtained by mechanical processing (crushing and grinding) of natural potash salts in the immediate vicinity of mining sources. This group of fertilizers include sylvinite and cainite;

- Concentrated potash fertilizers are obtained by chemical processing from less concentrated formations of potash salts. This group includes potassium chloride, potassium salt, potassium sulfate, potassium sulfate - magnesium, kalimagnesia.

3) Phosphorous fertilizers are applied to the site in autumn, early spring or during sowing. The raw materials for obtaining phosphorous fertilizers are natural phosphorous-containing ores - apatite and phosphorite, as well as waste from the metallurgical industry. Phosphorus fertilizers in the following forms:

- Containing phosphorus in a water-soluble form - phosphorus is readily available to plants. This group includes simple superphosphate, double superphosphate, superphosphate;

- Containing phosphorus, insoluble in water, but soluble in weak acids (2% citric acid) - phosphorus of these fertilizers is available to plants to a slightly lesser extent. This group of fertilizers includes precipitate, tomosclag, open-hearth phosphate slag, defluorinated phosphate;

- Containing phosphorus, insoluble in water, poorly soluble in weak acids and completely soluble in strong acids (sulfuric, nitric) - phosphorus of these fertilizers is difficult to access for most plants. This group includes phosphorite flour, bone meal.

4) Complex fertilizers – fertilizers containing two, three or more elements of nutrition: nitrogen, phosphorus, potassium, magnesium, sulfur and trace elements. Additives are used both in autumn and spring, and in summer. They are evenly distributed over the General surface of the area under the tree crowns. Liquid preparations are sprayed in dilute form, solid ones are sealed before soil treatment.

Complex fertilizers, depending on the amount of nutrient components, are double and triple. By production methods - complex, difficult-mixed and mixed. According to the form of release - liquid, suspended, granular. All technologies for producing complex fertilizers are reduced to nitric acid decomposition of phosphate raw materials or the use of phosphoric acids. Complex fertilizers are highly soluble and highly effective in all types of soils.

5) Micronutrient fertilizers are mineral fertilizers containing trace elements. The most common are boric, manganese, molybdenum, copper and zinc micronutrients. Micronutrient fertilizers according to the active substance are distinguished by:

- molybdenum (ammonium molybdate, ammonium molybdate - sodium, granular molybdenized superphosphate);
- zinc (zinc sulfate);
- copper (copper sulfate or copper sulfate, copper sulfate, pyrite cinders);
- boric (boric acid), granular borosuperphosphate, double borosuperphosphate, bormagnesium fertilizer, etc.);
- manganese fertilizers (manganized superphosphate, manganized nitrophosphate, manganese sludge, manganese sulfate pentahydrate) [1].

The World practice

Also, some people got arguments about the harm of mineral fertilizers to the environment. However, the most developed and economically prosperous countries use them in the largest quantities. An example is Japan, where human life expectancy is one of the longest in the world.

Indeed, the main problems of environmental problems are not so much related to chemical pollution due to the use of mineral fertilizers, but rather to the prevalence of extensive forms of management and insufficient or illiterate use of mineral fertilizers and other chemical means.

Numerous studies show that the use of mineral fertilizers is one of the main factors for obtaining high crop yields and improving soil fertility.

In world practice, the growth trend in the production and use of mineral fertilizers continues. According to the intensity of application of mineral fertilizers per 1 ha of arable land, the top ten countries include Malaysia, The Netherlands, Korea, Jordan, Belgium, Egypt, New Zealand, Japan, Great Britain and Colombia. There is a clear relationship between the doses of applied fertilizers per 1 ha and the yield. It was found that the highest doses of mineral fertilizers are used in France, The Netherlands and the United Kingdom. The average grain yield in France – 73,2 C/ha, The Netherlands – 82,9 C/ha, great Britain - 70.8 C/ha. For comparison, in Kazakhstan, the yield was 10 C/ha in 2019.

Fertilizer application

Compliance with the four R rules - the right product, the right rate, the right time, the right place - the key to the harmonious development of the fertilizer industry, according to the International Association of Fertilizer Manufacturers. This will allow, without increasing the load on the ecosystem, to maintain high crop yields.

The nutritional requirements of different crops vary. The most important factor in determining the need of agricultural crops for fertilizers is the size of the removal of nutrients from the soil with the harvest. The size of the takeaway depends on the yield. At the same time, the removal of nutrients of the same type of cultivated plant varies quite widely and depends on the variety, soil, climatic conditions, the level of agricultural technology, and many others. All agricultural crops for the removal of fertilizers are divided into three groups:

- low-yield crops (cereals, legumes, cereals);
- high-yield crops (row crops);
- crops with a very high yield (vegetable, fruit and berry).

It is known that most crops tolerate more nitrogen, but less potassium and even less phosphorus. But in sugar beets, forage roots and vegetables, and perennial grasses, the removal of potassium may exceed the removal of nitrogen.

The complex of consistently performed operations for the introduction of fertilizers is the technology of fertilizer application, which provides for doses of fertilizers, methods, timing and methods of their application and sealing.

A properly selected fertilizer system includes all available types of fertilizers, both mineral and organic, in combination with pesticides and other plant protection products.

The main application (pre-sowing, pre-sowing) - is made in autumn or spring, depending on the type and form of fertilizer. Meets the needs of plants throughout the growing season. Pre-sowing treatment of seeds before – a set of measures to prepare seeds for sowing by treating them with trace elements, pesticides and other substances that help accelerate their growth and development. Seedling application (row) - provides plants with nutrients for the period from germination to the appearance of full-ripened shoots. Top dressing (post-seeding fertilizer) is used to provide plants with nutrients at the stages of intensive growth and maximum need for nutrients [1].

1.2 International Fertilizer Association

What does the IFA Association do?

The international fertilizer Association (IFA) was founded in 1927 and is the only global organization that unites 476 companies operating in the fertilizer sector from 67 countries. 45% of IFA members come from developing economies. The company is headquartered in Paris, France.

IFA's vision is that productive and sustainable agricultural systems contribute to a world free from hunger and malnutrition.

IFA's mission is to promote the efficient and responsible production, distribution and use of plant nutrients.

According to the IFA, "the fertilizer industry plays an important role in feeding the world's growing population. It is estimated that mineral fertilizers account for more than 50% of modern food production. This industry provides direct employment to about 1 million people worldwide and produces fertilizers and raw materials worth us $ 218 billion annually".

The International Association of fertilizer manufacturers (IFA) named only Eastern Europe and Central Asia as regions where the expansion of capacities for the production of nitrogen, phosphorus and potash fertilizers will continue. One of the trends in the market of mineral fertilizers is the tightening of environmental measures.

Balanced consumption of mineral fertilizers in agriculture, i.e. with minimal losses and minimal harm to the environment, is becoming increasingly important in the world. Environmental protection measures are being strengthened both at the level of international organizations and at the level of individual States.

The rating of the largest regions-consumers of mineral fertilizers is still headed by East Asia. It remains the dominant region at the expense of China, followed by South Asia, which is mainly represented by India, then North America and Latin America.

IFA's scenarios highlight large-scale forces-mostly not directly controlled by plant nutrition industry is something that can move the industry in different directions. Whereas we know that the future is agricultural production must increase to keep up with the growing population, and this innovation cannot be stopped force, we can't know the exact rate of change: these large-scale forces eventually make themselves felt in there is either a relatively weak or stronger drive for innovation across the agri-food value chain, and relatively slower or more vigorous growth in agricultural production [2].

Diagram 1 . The IFA's future scenarios of fertilizers demand, depending on Growth of the market (Y) and Innovation (X).

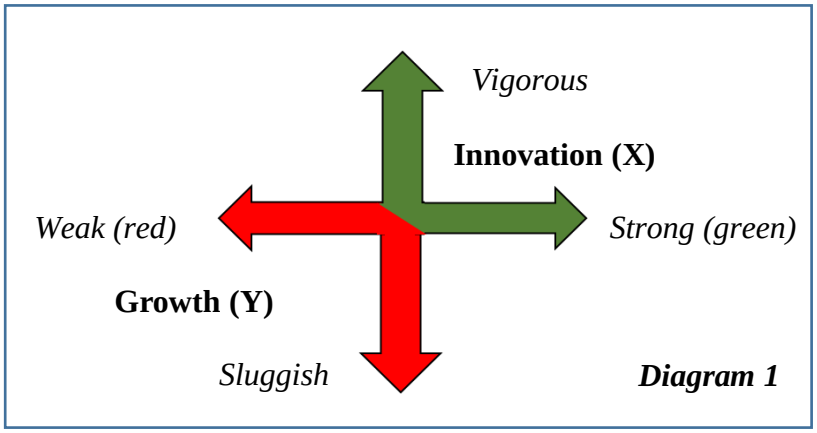


Diagram 1

Scenarios' description:

1) Reduced dynamism - Sluggish growth, weak innovation. A world with slow growth in agricultural production and lower rates of innovation. Dynamism as demand for fertilizers slows while the industry, given the weak drivers for innovation, will not take up new products and approaches. In lack of innovative approaches to improving the efficiency of nutrient use productivity, environmental impact related to current processes inefficiency will worsen, even in the absence of high growth in demand for fertilizers.

2) New Horizons - Strong growth, strong innovation .A world with strong growth in agricultural production a high external incentives for innovation. A stronger push for innovation will release strong competitive forces but continued strong growth in agricultural production can provide a great respite for the product fertilizer manufacturer.

3) Commodity Classic - Strong growth, weak innovation. A world with strong growth in agricultural production and lower rates of innovation. This is the one that reminds industrial operating environment of the last decades. If so the environment endures, the industry will remain mainly it is focused on the production of commercial fertilizers and fertilizers strong growth in demand for fertilizers.

4) Ready, Set, GO! - Slow growth, strong innovation. A world with slower growth in agricultural production but with strong drivers for innovation. In this scenario, the pace of agricultural development is slowing down production growth will occur for a number of reasons along with a wide variety of innovations.

Detailed analysis can be found in the IFA 2030 scenario report [3].

1.3 The case of Kazakhstan: Overview of current data

First step to analyzing is learn the macroeconomic factors for the analysis of overview of agriculture in our country, including historical data of:

- Value added of the agricultural sector as a percentage of GDP;

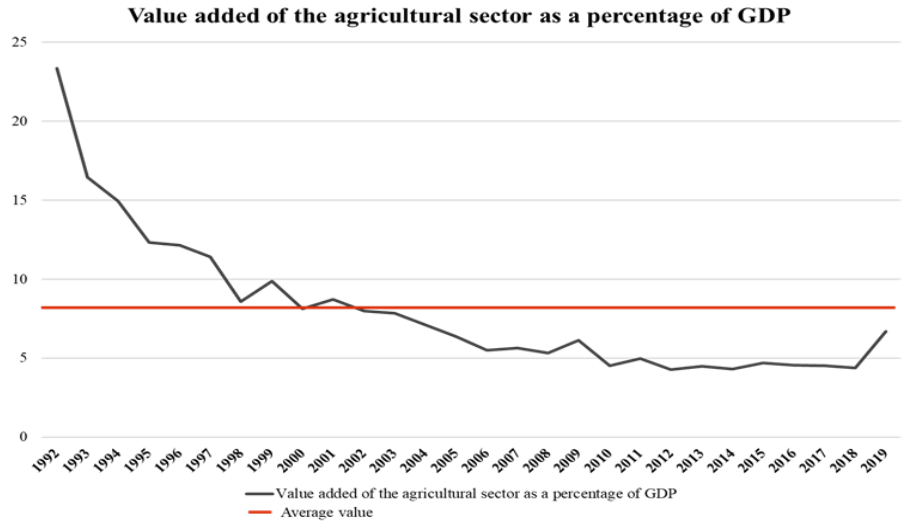
- Employment in agriculture, % of total employment;
- Innovation index,

and the forecast by Ministry of Finance of The Republic of Kazakhstan for 2020-2024 years:

- GDP forecast for Kazakhstan 2020-2024 years;
- Expected growth rates of the economy 's sectors.

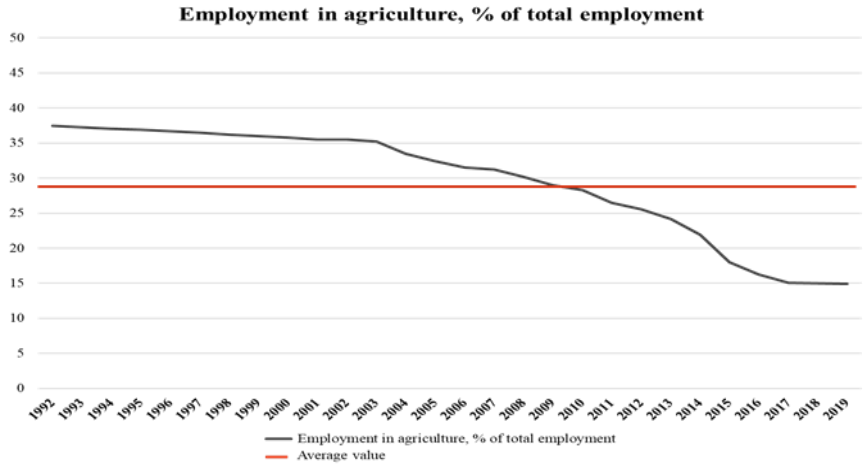
Historical overview of Kazakhstan in 1992-2019

Diagram 2. Value added of the agricultural sector as a percentage of GDP / Kazakhstan (1992-2019)



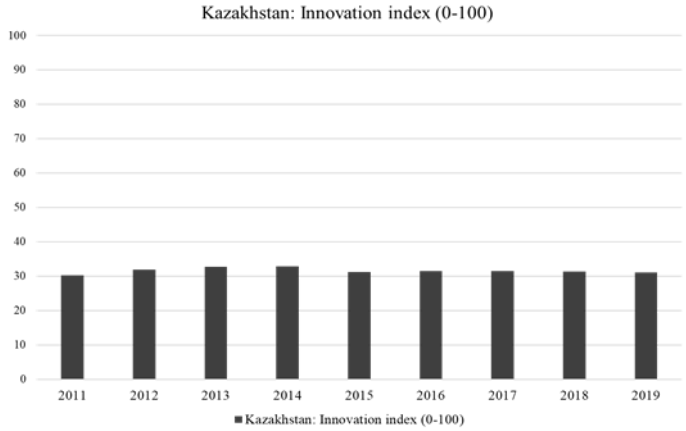
For this indicator, The World Bank provides data on Kazakhstan for the period from 1992 to 2019. The average value for Kazakhstan during this period was 8.1 %, with a minimum of 4.29 % in 2012, and a maximum of 23.34 % in 1992 [4]. The contribution of agriculture to the country's GDP has been declining since 1992 to 2018. Also, there is an increase in 2019 compared to 2018 – 6.7% of GDP.

Diagram 3. Employment in agriculture, % of total employment (1992-2019)



For this indicator, The World Bank provides data on Kazakhstan for the period from 1991 to 2019. The average value for Kazakhstan during this period was 29.9 %, with a minimum of 14.89 % in 2019, and a maximum of 37.65 % in 1991 [5]. There is a decline in the number of workers in the agricultural sector.

Diagram 4. Kazakhstan: Innovation index (0-100) (2011-2019)



Innovation in this sector is seen as a player to change games, which is interrupted when new players enter the market and to the level of innovative technologies and services. Operational efficiency, including plant, process and logistics efficiency, will remain key factors, and customer orientation and adaptation and readiness will become increasingly important prerequisites for success.

For this indicator, Cornell University, INSEAD, and the WIPO provides data on Kazakhstan for the period from 2011 to 2019. The average value for Kazakhstan during this period was 31.59 points, with a minimum of 30.3 points in 2011 and a maximum of 32.8 points in 2014 [6]. The demand for fertilizers in the world is completely dependent on the introduction of innovations in agriculture. In Kazakhstan, the innovation index has been estimated at almost the same level in recent years.

The forecast of the country's macroeconomic indicators for 2020-2024.

The forecast of the country's macroeconomic indicators for 2020-2024 is formed taking into account the reported data on GDP for 2018 and the updated estimate for 2019, forecasts of international organizations for the growth of the world economy and trends in world prices on commodity markets.

As a basis for the preparation of the draft national budget for 2020-2022 the basic scenario was taken, which assumes a gradual increase in the growth rate of the world economy in 2020 – 2024 while maintaining its stability.

Real GDP growth is projected at 4.1% in 2020, with further growth to 4.7% in 2024. The average annual GDP growth rate for the upcoming medium-term period will be 4.4%. [7]

Diagram 5. GDP forecast for Kazakhstan 2020-2024 years

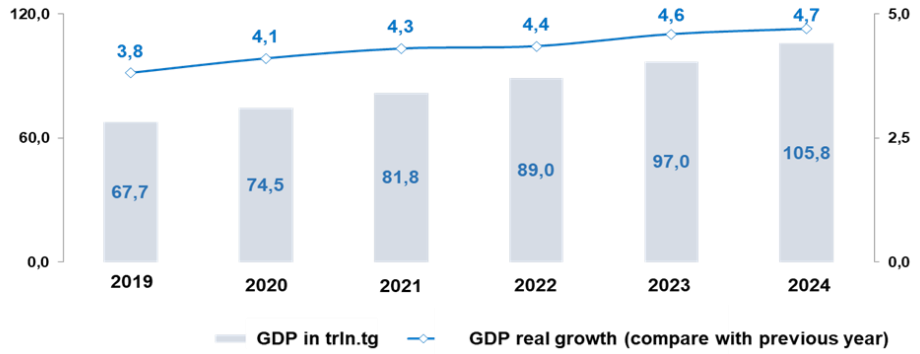


Table 1. Growth rates of the Kazakhstan economy's sectors (in % to the previous year)

Name of sector	2019 year	Forecast				
		2020 year	2021 year	2022 year	2023 year	2024 year
Production of goods	102,4	103,8	103,7	103,5	105,7	103,6
Agricultural industry	106,3	108,0	105,3	106,2	106,3	106,5
Industry	101,5	103,1	103,3	102,9	105,8	102,8
Mining	100,0	102,1	102,3	101,4	107,1	100,7
Processing	103,9	104,7	104,9	104,7	105,2	105,1
Construction	103,7	103,8	104,1	104,3	104,6	104,6
Production of services	104,8	104,3	104,7	104,9	103,9	105,4
Trade	104,3	104,6	104,9	105,2	105,4	106,0
Transport	103,8	103,2	103,2	103,2	103,5	103,6
Information and communication	103,0	103,2	103,7	104,0	104,2	104,4

The forecast for increasing agricultural growth is expected for the next years. The constant growth of the agricultural market will encourage GDP growth, and the market as a whole is expected to develop in 2024.

State policy in the agriculture sector in Republic of Kazakhstan

The agro-industrial complex is one of the important sectors of the economy, which through the formation of food security of the country participates in ensuring the national security of the country. Agriculture of the Republic of Kazakhstan has prospects for further development: there are markets, of arable land, there are prospects for the development of irrigated agriculture, increase the export position of oilseeds, the grain and the flour of Kazakhstan in the shortest possible time is among the largest exporting countries in the world.

During the period of independence, eleven program documents were developed, on the basis of which the state policy in the field of agriculture was implemented:

- The program of socio-economic development "Auyl" for 1991-1995 and for the period up to 2000;
- The Conceptual program for the development of the agro-industrial complex for 1993-1995 and up to 2000;
- The program for the development of agricultural production for 2000-2002, the State agri-food program for 2003-2005;
- The State program for the development of rural territories for 2004 – 2010;
- The Concept of sustainable development of agriculture for 2006-2010;
- The Program of priority measures to implement the Concept of sustainable development of the agro-industrial complex of the Republic of Kazakhstan for 2006 – 2010;
- The program of agribusiness development for the years 2010-2014;
- The Program for development of agribusiness complex in the Republic of Kazakhstan "Agrobusiness-2017";
- The Program for the development of the agro-industrial complex in the Republic of Kazakhstan for 2013-2020 "Agribusiness-2020";
- The State program for the development of the agro-industrial complex of the Republic of Kazakhstan for 2017-2021.

The document "Agrobusiness-2017" described the problems of fertilizer use in the agro-chemistry industry in our country:

1) high cost of mineral fertilizers with annual price growth;

2) the absence of a legal basis for the licensing procedure for state registration of agrochemicals and a permit for the right to use agrochemicals in the country in the list of permits of the second category;

3) a narrow range of mineral fertilizers produced by domestic enterprises;

4) lack of developed transport and logistics infrastructure (insufficient storage capacity or lack of warehouses for storing fertilizers in the regions and lack of fertilizers produced by plants when a large volume of fertilizers is needed at the same time during the season of agricultural work, delayed provision of railway transport).

The State program for the development of the agro-industrial complex of the Republic of Kazakhstan for 2017-2021 - current state program for today. Program developed in accordance with the instructions of the Chapter state, given at an expanded meeting of the Government of the Republic of Kazakhstan dated September 9 2016, in accordance with the strategic development goals of the Republic of Kazakhstan, identified in the Plan of the nation “100 concrete steps” and the Strategy “Kazakhstan-2050”. Achievement in 2021 after all realized programs of the following indicators:

- increase of labor productivity in rural 38% in real terms to the level 2015 year;
- increase of gross output (services) of rural farms by 30% in real terms to the level 2015 year;
- increase in food exports $ 600 million worth of goods;
- decrease in food imports $ 400 million worth of goods;
- increase of wholesale food goods by 29% compared to 2015.

Established rules for subsidies, date, calculations and amount of budget

To understand the structure of subsidies, firstly, need to study the budgeting process of the code of the Republic of Kazakhstan. In the Code of the Republic of Kazakhstan dated December 4th, 2008 No. 95-IV,in article 35, under the title "Budget programs aimed at providing transfers and budget subsidies", there are definitions:

Budget subsidies are non-refundable payments from the budget that are provided to individuals and legal entities, including farmers or farms, only if there is no other way to perform state functions and implement the goals of socio-economic development of the Republic or region in cases stipulated by legislative acts of the Republic of Kazakhstan. The procedure for paying subsidies from the budget is determined by the Central state bodies in agreement with the Central authorized body for state planning and the Central authorized body for budget planning [8].

Based on the code, subsidies are payments made at the expense of the state or local budget, as well as payments from special funds for legal entities and individuals, local governments and other States. And subsidizing agro-industrial complexes is the automation of business processes for financing grant recipients on a gratuitous and irrevocable basis. Currently, the provider of this type of service is the Qolday Entrepreneurship Center. The electronic register of applications is maintained in accordance with the Law of the Republic of Kazakhstan "On state regulation of the development of agro-industrial complex and rural territories" and other regulatory legal acts.

Today there are two existing schemes for subsidizing fertilizers in Kazakhstan. First, if the subsidy is transferred to agricultural producers:

1. Application on receiving subsidies. The form is available in appendix 1;

2. Department of agricultural district (urban governance)

- Within 2 working days checks documents;

- Sends documents within 1 business day to department of agriculture in the region.

3. Department of agriculture in the region

- Submits payment documents within 2 business days.

4. Treasury

- Due to the transfer of budget subsidies;

5. Obtaining subsidies for agricultural producers.

Second, if the subsidy is transferred to the fertilizer producer:

1. Applications for payment subsidies;

2. Department of agricultural district (urban governance)

- Within 2 working days checks documents;

- Sends documents within 1 business day to department of agriculture in the region.

3. Department of agriculture in the region

- Within 2 working days, a list of approved requests for payment and sends to the fertilizer manufacturer;

- Submits payment documents within 2 business days.

4. Fertilizer producer

- The software registry is provided monthly until the 5th day actual sales volumes

5. Treasury

- Due to the transfer of budget subsidies;

6. Obtaining subsidies for fertilizer producers.

7. Trading between fertilizer producers and agricultural producers (farmer).

Since 2018, it has been possible to submit applications for subsidies online, via the website https://subsidies.qoldau.kz/. Expected result the automation of the subsidy on Qolday:

1. Increasing the availability of government support measures for farmers';
2. Reduction of corruption risks in the issuance of subsidies;
3. Improving the efficiency of resource management by reducing time to review and make decisions on the payment of subsidies;
4. Ensuring transparency at all levels of decision-making;
5. The exclusion of personal contact the participants in the process;
6. Reducing cognitive distortion of information;
7. Receiving reports on subsidies in real time by by region, type, time, and other parameters;
8. Reduction of direct and indirect costs associated with conducting measures to create a list of recipients of subsidies [9].

The next regulatory document for familiarization is about «Approving the rules for subsidizing the cost of mineral fertilizers (except for organic ones)». Order of the Minister of agriculture of the Republic of Kazakhstan dated April 6, 2015 No. 4-4 / 305. It describes how subsidies are calculated. Subsidies are calculated based on the types and volumes of fertilizers declared by the agricultural producer (agricultural cooperative) (taking into account the norms for applying fertilizers to the sown area specified in the applications), the list of fertilizers and approved subsidy rates according to the following formula: C = NB x S x Nc, where:

- C-amount of subsidies due, tenge;

- NB - the rate of fertilizer application per 1 ha, taking into account the agrochemical state of the soil, placed in the subsidy information system for calculating subsidies (ton / ha, kilogram / ha, liter / ha in physical weight);

- S-fertilizer application area, ha (this area does not exceed the area of agricultural land owned by this agricultural producer (agricultural cooperative) on the right of land use and (or) private property);

- NC-fertilizer subsidy rate, tenge (determined in accordance with paragraph 9 of these Rules). At the same time, when purchasing lower rates of fertilizer application, subsidies are calculated based on the actual purchased fertilizers, and in case of exceeding the rates of fertilizer application, subsidies are calculated according to the established rates of fertilizer application.

Also about the procedure for paying subsidies. Applications (applications for transfer) are accepted at the location of the land plot from February 1 to December 1 of the corresponding year.

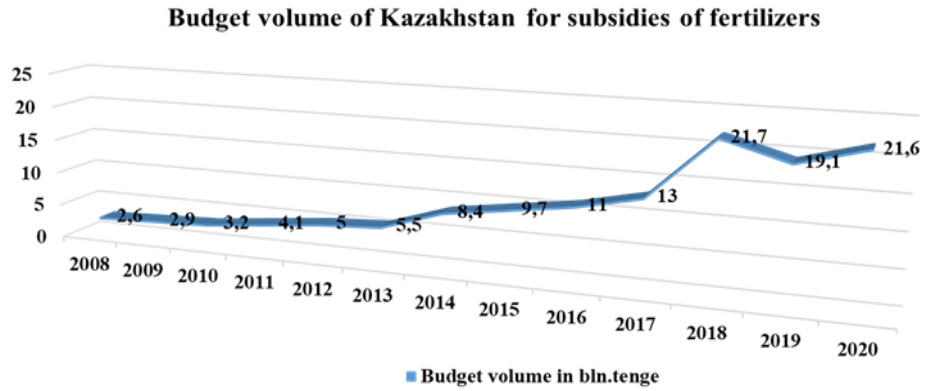
To grant access to registry data (hereinafter referred to as the personal account):

1. Agricultural producers (agricultural cooperatives) and fertilizer producers must have a digital signature;

2. The city administration, regional administration, and Ministry annually send the service provider updated lists of employees with EDS [10].

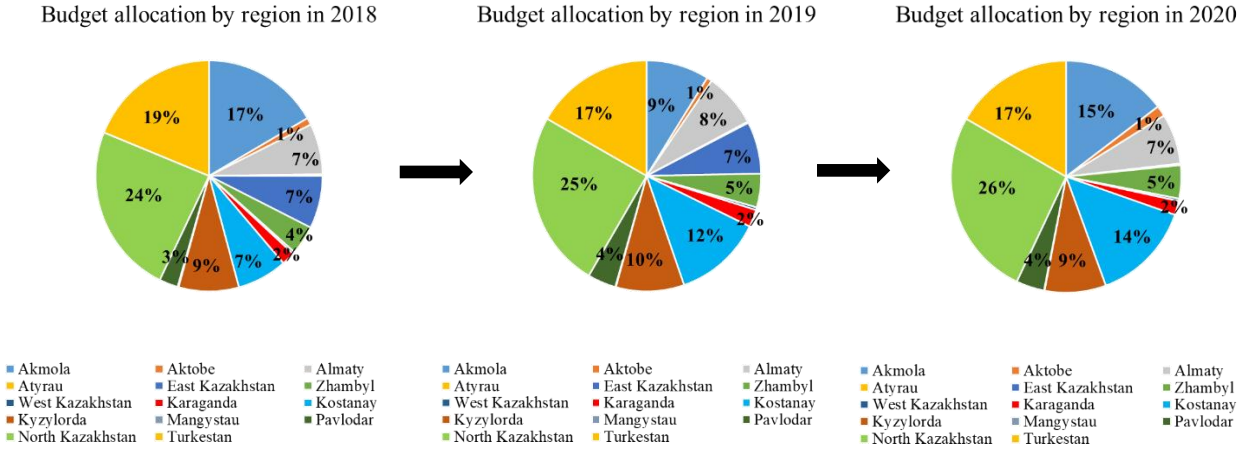
Kazakhstan is trying to improve the issue of improving soil fertility with the allocation of budget funds. Every year there is an increase in the amount of funds allocated to support farmers, to reduce the cost of products. Due to the fact: if a farmer buys domestic subsidies, there is a 50% discount, and if foreign products-only 30%.

Diagram 6. Budget volume of Kazakhstan for subsidies of fertilizers 2008-2020.



The diagram shows an increase in budget funds for subsidizing fertilizers since 2008-2020. The target is to increase the use of mineral fertilizers among farmers. Nowadays, communication channels with farmers are also simplified.

Diagram 7-9. The distribution of the budget between the regions of Kazakhstan for 2018-2020 [11].



The distribution of the budget for subsidies is shown in figure. In 2020, more than 21,6 billion tenge was allocated for Kazakh farmers (approximately 51 million dollars, at the rate of 1 dollar – 425,20 tenge). More than 25% of the budget is allocated to North Kazakhstan, because the region is considered a leader in growing cereals and flax. 17% is allocated to the Turkestan region, farmers grow vegetables and potatoes in the region, and is one of the leaders in growing maize in Kazakhstan (after the Almaty

region). 15% and 14% go to the Akmola and Kostanay regions, they are also regions of cultivated cereals.

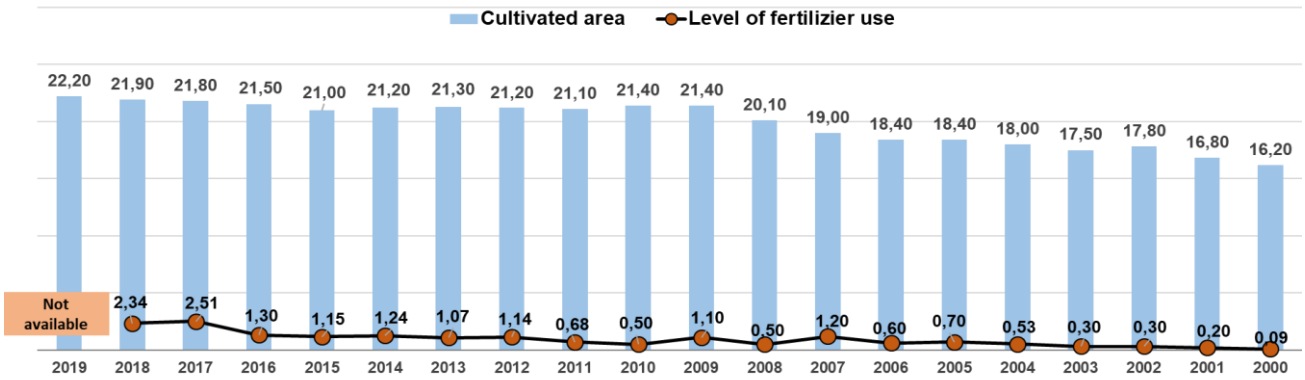
Report on the results of fertilizer use in Kazakhstan

Every year The committee of Statistics prepares a form with the results - F-2 Application of mineral and organic fertilizers. The indicator reflects the amount of mineral and organic fertilizers applied per unit area of cultivated land and perennial plantings. Methodology the indicator is formulated in accordance with "Technique on forming of statistics of the environment", approved by order of acting Chairman of the Committee on statistics of MNE of RK №223 dated December 25, 2015.

The Committee on statistics of the Ministry of national economy is the responsible state body for generating data on the introduction of mineral and organic fertilizers. Information is generated once a year based on the results of national statistical observations in the following forms: "on the harvest of agricultural crops" (form index – 29-CX, annual) and "on the harvest of agricultural crops in small farms or farms and households" (form index –A-005, annual).

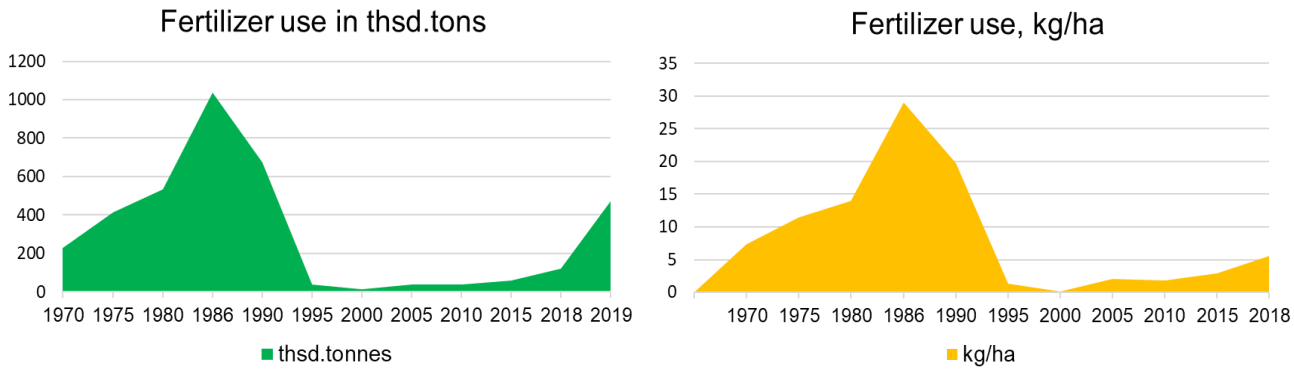
This indicator makes it possible to assess the impact on the environment through fertilization (accumulation of excess nutrients in the soil, resulting contamination of surface and underground water, as well as the migration of nutrients along trophic chains and their penetration into other components of the environment). Analysis of time series of data on fertilization allows you to monitor their impact on the environment and develop strategies to combat the negative effects of fertilizers on the environment. [12].

Diagram 10. Area of agricultural land and area of mineral fertilizer used in mln.ha



The diagram shows the area of agricultural land and the area treated with fertilizers. The scale is very large. The data shown in the diagram raises the question, why do we cultivate very little land? My presumed answer to the question - the consumption of fertilizers does not correspond to the needs of the land. The annual demand of the Republic for organic fertilizers with an area of arable land of 21-22 million hectares is about 100-110 million tons with a scientifically-based rate of application of 5 kg/ha.

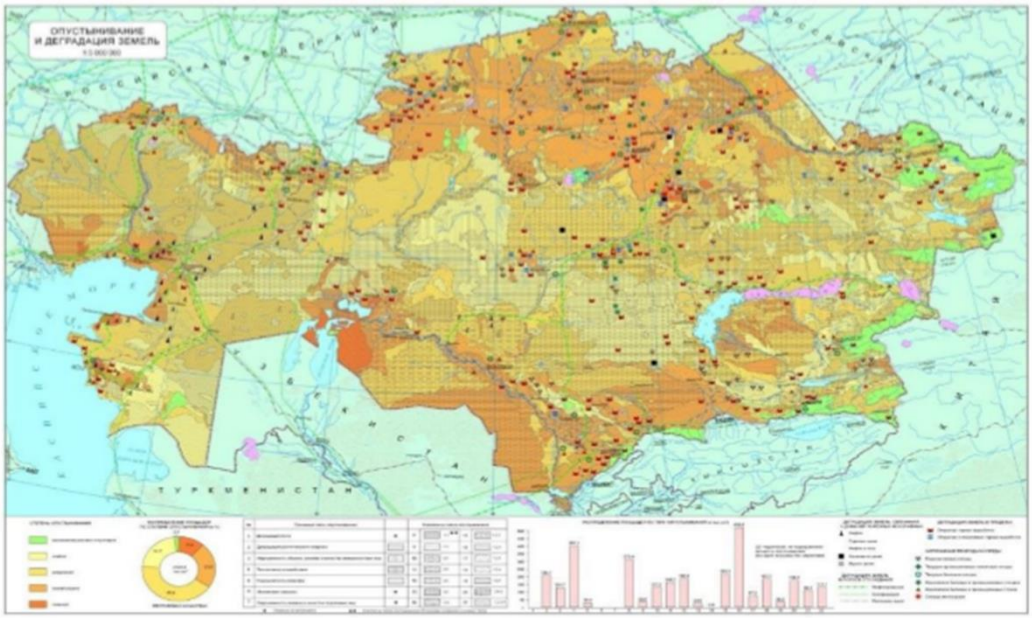
Diagram 11-12. Fertilizer use in the 1970 - 2018 in Kazakhstan



Data on the use of fertilizers to enrich the soil with active ingredients shows that in the period 1970-1986 there is an increase in use. After 1990, after the independence of the state, there is a terrible decline in the use of 0.1 kg in 2000. Today, there is an increase in the use of fertilizers to 470 thousand tons. This growth is due to subsidizing mineral fertilizers at the expense of the state. Whether we will get the level of use as in 1986 depends entirely on the state programs in the agro-industrial complex. [13].

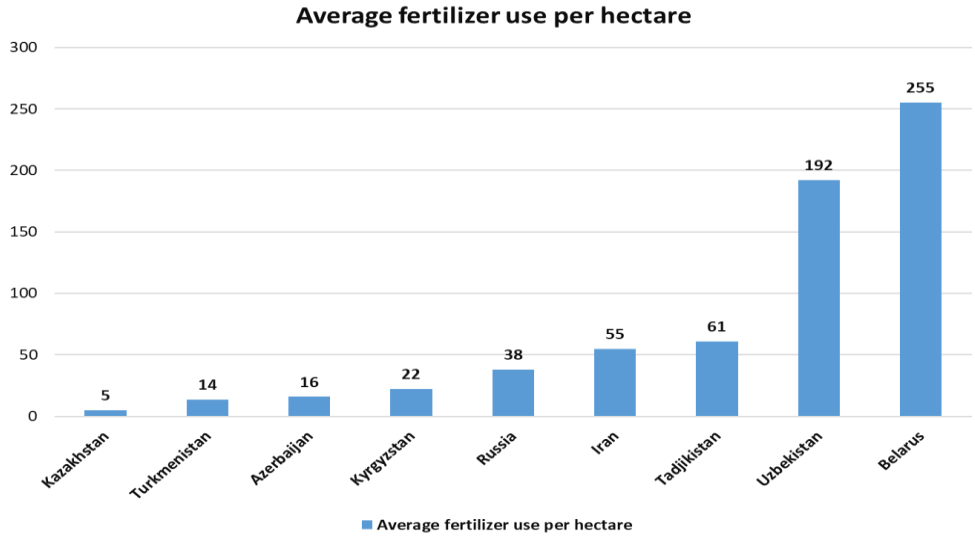
Industry Potential in the Domestic Market

Map 1. Soil degradation in Kazakhstan (Sources: World Bank and Kazakhstan Institute of Soil Science)



By 2014, 60% of the soil cover of the Republic of Kazakhstan related to various degrees to degraded. According to UNDP (United Nations Development Programm), 20% of the NKR soils can be classified as highly eroded. [14].

Table 13. Average fertilizer use by neighbor-countries in 2017



The ex - Chairman of the Board of the Kazakhstan Institute of industry development (KIRI) under the Ministry of investment and development of the Republic of Kazakhstan Aydin Kulseitov during an interview with the business information center Kapital.kz in 2017:

"The consumption of fertilizers in Kazakhstan per hectare of agricultural land is 4.9 kilograms. For comparison, our neighbors in Kyrgyzstan have this indicator five times higher — 22 kilograms, while in

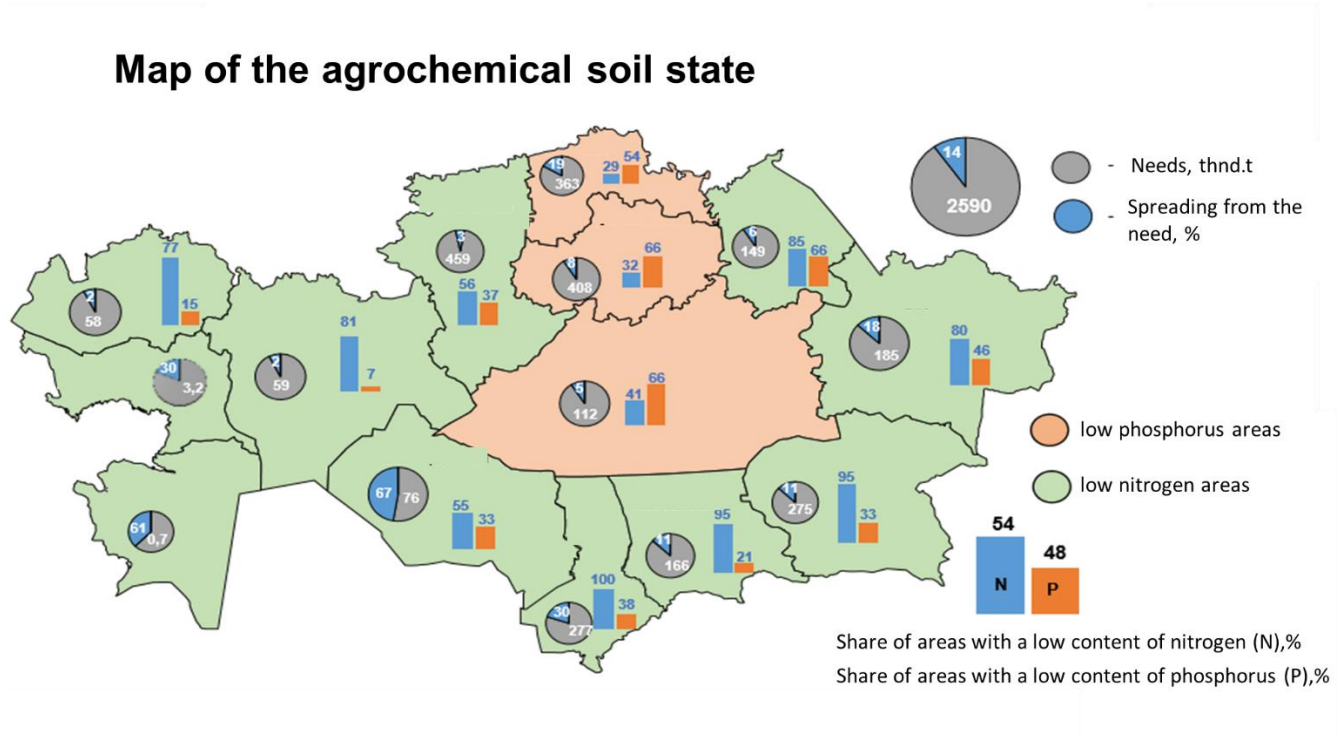
Uzbekistan it exceeds 30 times — 150 kg per hectare. If you compare with our Northern neighbors, for example, in Russia they use 39 kilograms per hectare, in Belarus — 50-60 kilograms, in Ukraine — from 80 to 100 kilograms per hectare. We are among the countries that consume the least fertilizers per hectare. And all this is happening against the background of the fact that the myth is spreading that this is the way it should be, that we should be clean, producing "organic-food". Although no one really talks about GMOs, we just don't even make up for the phosphorus, potassium and nitrogen that we took from the soil. As a result, it is not recovering and is rapidly getting poorer", the end of fragment [15].

An increase in fertilizer application from 4.8 kg to 20 kg by opinion of World Bank and Kazakhstan Institute of Soil Science will lead to:

- Increase consumption: Phosphate fertilizers up to 790 thousand tons (+590 thousand tons); Nitrogen fertilizers up to 1100 thousand tons (+700 thousand tons); Potash fertilizers up to 115 thousand tons (+90 thousand tons); The consumption of all mineral fertilizers will be 2 million tons; 3 times growth;
- Expanding the range of applied mineral fertilizers;
- Development of services (providing advisory and practical assistance on fertilizer application).

According to the results of 2019, farmers of the Republic of Kazakhstan applied 470 thousand tons of mineral fertilizers (including 402 thousand tons or 85% of subsidized fertilizers). For these purposes, subsidies were paid in the amount of 19 billion tenge. According to the results of last year, the indicator of fertilizer use was 18% of the scientific demand. Good indicators are observed in North Kazakhstan and Kostanay regions, these regions significantly increase the volume of fertilizer use. But at the same time, there are areas with low volumes of fertilizer application (low fertilizer application is noted in the Karaganda region and Pavlodar regions). For 2020, the local budgets of the regions provide 23.3 billion tenge, which will allow to purchase about 480 thousand tons of mineral fertilizers [16].

Map 2. Agrochemical Soil state (2017) [17].



As a result of long-term use, most of the land in Kazakhstan is subject to erosion, salinization (especially in the southern regions) and is generally depleted. Of the 2.5 million tons of fertilizers needed for the entire agricultural area of Kazakhstan, only 20% is applied. Possible reasons for the lack of fertilizers are the conversion of public facilities to private ones, the reduction in the size of farms, and the lack of agronomists among workers. Thus, small farms do not invest in developing the potential of land resources, they use fertilizers to achieve a visible effect, rather than a qualitative one. Large farms invest more in fertilizers. The most critical situation is in the Southern and Eastern regions, where irrigation technology is not observed: a sharp decrease in the content of nutrients in the soil itself, due to less intensive use of mineral fertilizers. In the North, the soil condition is relatively normal,but it also requires a large amount of fertilizer. Most farmers do not have the slightest idea about the state of the soil on their farm, they do not know that they can get this information from an Agrokhimsluzhba.

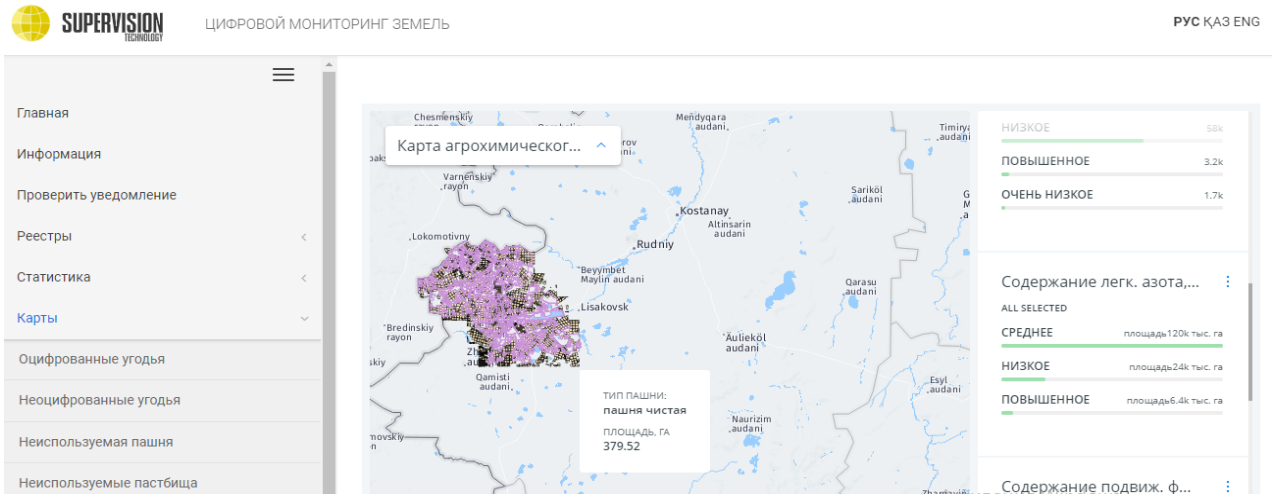
In February 2019, Bakytzhan Sagintayev, the former Prime Minister of Kazakhstan, responded to a request from deputies about new rules for subsidizing fertilizers and plans for 2019-2020.

«With the aim of efficient application of fertilizers based on the results of agrochemical soil conditions of rules of subsidizing of cost of fertilizers (except organic) a provision for payment of subsidies for fertilizers subject to the registration in the information system of subsidizing electronic agrochemical

cartograms, issued "Republican scientific-methodical center of agrochemical service of the Ministry of agriculture of the Republic of Kazakhstan" (Agrokhimsluzhba) or a specialized accredited laboratory for agrochemical soil analysis, on the fertilized area of agricultural land plots.

The Republic has a database of agrochemical cartograms, formed by the agrochemical Service at the expense of budget funds based on the results of agrochemical surveys of soils. Currently, work is underway to upload this database of agrochemical cartograms to the subsidy information system for use by farmers when applying for subsidies.

Map 3. Database of agrochemical cartograms in 2020 (Denisovskiy district in Kostanay region is ready) [18].



In order to gradually transition to the introduction of a precision farming system, one of the elements of which is differentiated fertilization, it is planned to register the existing agrochemical cartograms compiled by the agrochemical Service or other laboratories from 2019 [19].

Also, starting from 2020, it is planned to use agrochemical cartograms with recommendations for fertilization. The mechanism for transferring subsidies to domestic fertilizer producers, according to the information provided, also remains the same. Payment of grants is carried out by akimats of the regions within the limits of funds allocated in local budgets.

Farmers are also given the opportunity to use the services of other accredited laboratories, along with the use of the material and technical base of the agro-chemical Service.

According to the National accreditation center of the Committee for technical regulation and Metrology of the Ministry of industry and infrastructure development, there are currently 123 accredited

laboratories in the Republic that provide services for determining soil indicators, including about 30 laboratories that provide services for determining the five above-mentioned agrochemical indicators». [20].

Production of mineral fertilizers, export-import in Kazakhstan

In Kazakhstan, the production of mineral fertilizers (phosphorous and nitrogen fertilizers) are mainly engaged in Kazphosphate LLP (superphosphate, ammophos) and KazAzot LLP (ammonium nitrate).

KazAzot LLP fully meets the needs of domestic economies in nitrogen fertilizers. Currently on Domestic market supplies 60% of the products. Over 40% of manufactured products are exported to countries near and far abroad. The main importers are Ukraine, Russia, Poland, Azerbaijan, Kyrgyzstan, Tajikistan, Turkmenistan, countries Baltic states, Hungary, Romania, Bulgaria.

In recent years, due to the observed growth in development agriculture in the world, the company LLP "KazAzot" plans to enter new markets. On the territory of the plant there are workshops for the production of ammonia, weak nitric acid and ammonium nitrate.

The Kazphosphate LLP company was founded on October 27, 1999 in accordance with the legislation of the Republic of Kazakhstan. The head office is located in Almaty. The main production facilities are concentrated in Zhambyl region, respectively, the operating activities of the Company are managed from an office located in the city of Taraz. Kazphosphate LLP is a unique company in Kazakhstan, owning a complete line from production to the supply of phosphates using its own means of the Railway Transport Complex and their processing on the final product.

The plant has the following main production facilities:

- production of phosphorus-nitrogen fertilizers - ammophos (a mixture of di- and monoammonium phosphate) 46% P2O5, 10% N;
- production of simple superphosphate 19% P2O5;
- production of sulfoammophos 18% P2O5, 18% N;
- nitroammophos production 22% P2O5, 22% N;
- production of feed tricalcium phosphate 27% P2O5;

- production of fodder calcium sodium phosphate_41% P2O5;

- production of sulfuric acid of technical H2SO4.

The bulk of the products sold in the domestic market. For several years, the state fertilizer subsidy program has been operating. for domestic agricultural producers. In addition, fertilizers are sold to the market of China, Ukraine, Belarus, Tajikistan. Held a large development of phosphate fertilizer markets in Afghanistan, Kyrgyzstan, Romania, Czech Republic, Bulgaria and Iran.

Map 4. Fertilizer plants and storage in Kazakhstan (2017) [17].

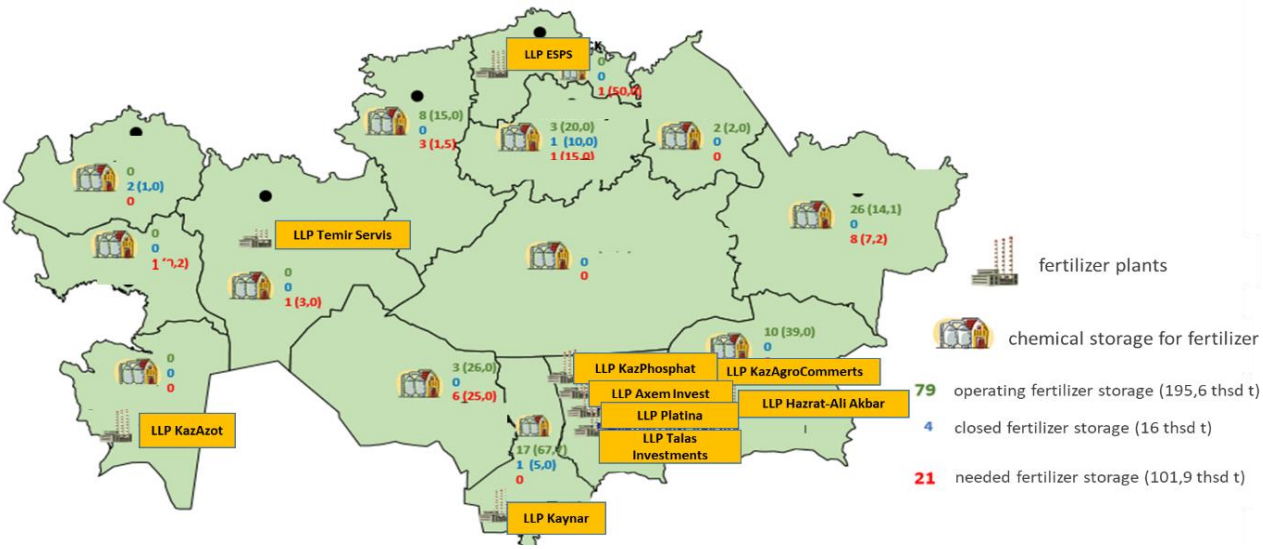


Table 2. Domestic manufacturers of mineral fertilizers [17].

№	Fertilizer production plants	Region	Fertilizer type	2017 / plan		2021 / forecast
				capacity	production	capacity
1	LLP KazAzot	Mangystau	Ammonium nitrate	330,0	312,9	330,0
2	LLP KazPhosphat	Zhambyl	Ammophos	300,0	275,0	500,0
			Phosphate-potash	0,9	0,9	5,0
3	LLP Temir Servis	Aktobe	Phosphoric rock	200,0	10,0	200,0
4	LLP Planina Asia	Zhambyl	Nitro-phosphate-potash	10,0	0,05	15,0

5	LLP Kaynar	Zhambyl	Superphosphate (mark b)	10,0	9,6	10,0
6	LLP Talas Investments Company	Zhambyl	Ammonium sulphate	5,0	2,3	5,0
7	LLP Axem Investment	Zhambyl	Superphosphate (concentrated)	4,5	4,5	5,0
8	LLP KosAgroKommerts	Almaty	Potassium sulphate	3,0	1,1	3,0
			Potassium chloride	3,0	1,0	3,0
			Suprephos-NS	15,0	13,0	15,0
			Calcium nitrate	2,0	0,4	2,0
			Kristalon	2,0	0,4	2,0
			CAS	3,0	0,5	3,0
9	LLP Hazrat Ali Akbar	Almaty	MERS	0,2	0,1	0,2
10	LLP ESPS	North Kazakhstan	Nitro-phosphate-potash fertilizers	19,0	15,0	60,0
Total				907,2	677,3	1 156,6
Nitrogen				338,0	315,7	338,0
Phosphate				559,4	328,1	810,0
Potash				6,0	2,1	6,0
Micro-fertilizer				4,2	1,5	4,2

If you look at the data, you can see that over 5 years the number of tons of fertilizer products amount produced by domestic plants is planned to increase for 27%. Nowadays. production facilities of processing enterprises are not used at full capacity.

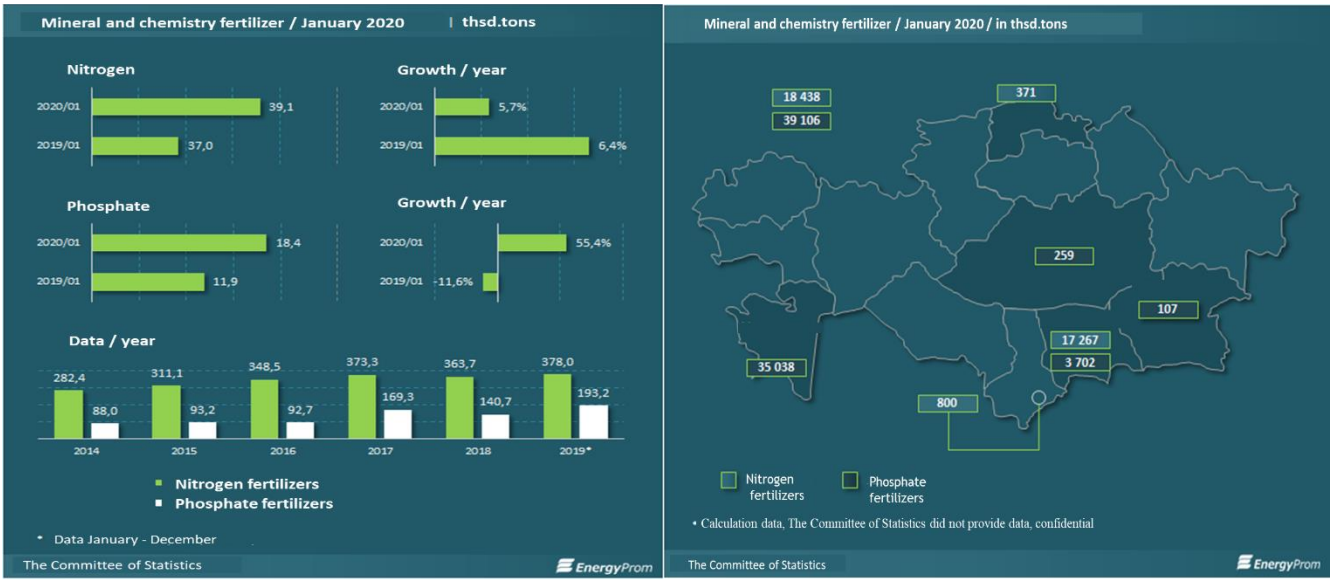
Considering the structure of Kazakhstan's fertilizer production, it can be noted that the structure of production of various types of mineral fertilizers has not changed for many years.

The raw material factor is the main one for the production of fertilizers - most of the nitrogen fertilizers are produced in Mangystau region - rich in oil and natural gas, phosphorus fertilizers - in Zhambyl region, where phosphate deposits are located.

Fertilizer producers are ready to support farmers and would prefer to work for the benefit of the domestic market to develop exports. In January 2020, Kazakhstan produced 39.1 thousand tons of mineral or chemical nitrogen fertilizers, compared to 37 thousand tons in the same period last year (+5.7%).

Production of phosphorous fertilizers amounted to 18.4 thousand tons, compared to 11.9 thousand tons in January 2019. The growth of production of phosphorous fertilizers was 55.4% for the year.

Diagram 14-15. Mineral fertilizer production in Kazakhstan 2014-2019 [21].



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In General, in January – December 2019, Kazakhstan produced 193.2 thousand tons of phosphorous and 378 thousand tons of nitrogen fertilizers. For comparison: in January – December 2018, the production of phosphorous fertilizers was 140.7 thousand tons, nitrogen - 363.2 thousand tons.

By region in January 2020, 93.6% of phosphorous fertilizers were produced in Zhambyl region, 4.3% in Shymkent, and 2% in the North Kazakhstan region. Recall that one of the largest companies in the industry, the giant "Kazphosphate", operates in Zhambyl region.

The leader in the production of nitrogen fertilizers is traditionally the Mangystau region, in January it managed to produce 35 thousand tons of products — 89.6% of the total volume in the Republic of Kazakhstan. The key enterprise of the sector — KazAzot-operates in the region.

In the segment of nitrogen fertilizers, demand was provided by Kazakh companies by less than half (48%). Imports grew noticeably faster than domestic production: 29.8% versus 4.1%.

As for phosphorous fertilizers, the market is fully provided with local production. Thus, in January–December 2019, Kazakh companies blocked demand (exports plus sales on the market) by 99.8%. It is noteworthy that, according to official data, only 3.4 thousand tons of phosphorous fertilizers were exported.

Meanwhile, the company "Kazphosphate" at the eighth agrochemical forum of Asia, which was held in Taraz, cited data that are very different from the indicators of the CS of the MNE of the Republic of Kazakhstan. So, according to the company, only last year "Kazphosphate" produced 500 thousand tons of fertilizers. In the near future, the plant plans to increase this figure to one million. General Director of the enterprise Mukash Iskandirov claims that most of the products produced by the plant are exported to 30 countries of the world, meanwhile, Kazakh farmers are ignored, reports Almaty.tv.

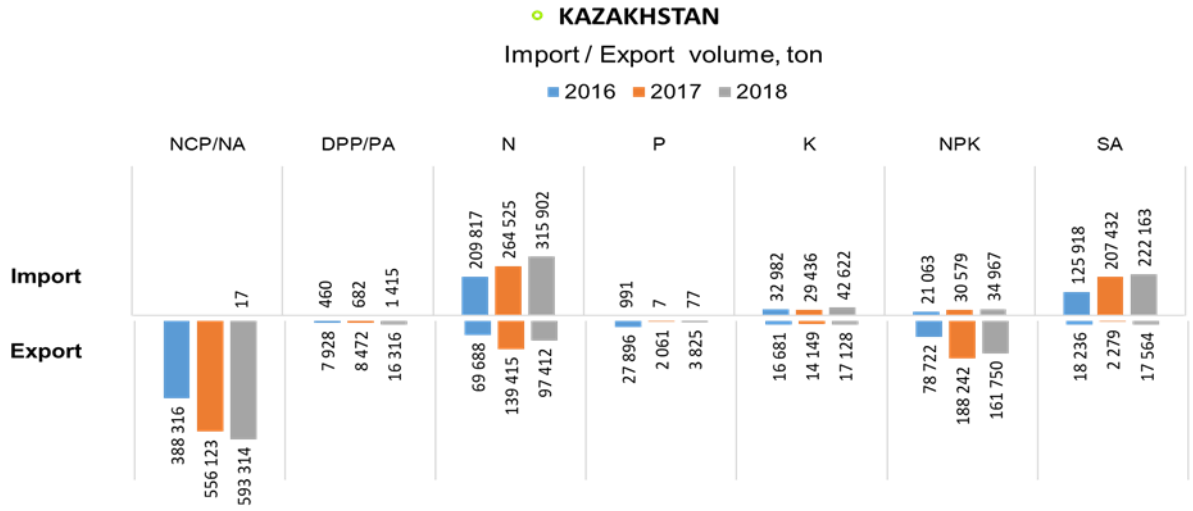
"As producers of mineral fertilizers, it would be convenient and correct for us to work in our region, in our country. Because the estimated demand for today in Kazakhstan is 2.5 million tons of fertilizers. And there are 400 thousand of them, including phosphorus fertilizers somewhere in the region of 90-100 thousand tons. This practically means nothing. " shared Mukash Iskandirov.

In General, at the meeting, farmers complained that the subsidies they receive from the state for fertilizers are not enough. Many difficulties arise with documents. Agricultural experts noted that the current state of agriculture in Kazakhstan still leaves much to be desired [21].

Kazakhstan : export / import countries of fertilizers

At present, in Kazakhstan, the production of mineral fertilizers does not cover their need. In this regard, the missing need for this type of product is covered by import.

Diagram 16. Kazakhstan export-import data of mineral fertilizers in tons. Data was generated in a chart, data from the site trademap.org



NCP/NA	Natural calcium phosphates and natural aluminium calcium phosphates, natural and phosphatic chalk
DPP/PA	Diphosphorus pentaoxide; phosphoric acid; polyphosphoric acids
N	Mineral or chemical nitrogenous fertilisers
P	Mineral or chemical phosphatic fertilisers
K	Mineral or chemical potassic fertilisers
NPK	Mineral or chemical fertilisers containing two or three of the fertilising elements nitrogen, phosphorus and potassium
SA	Sulphuric acid; oleum

The largest export and import volumes of fertilizers from Kazakhstan is nitrogen fertilizers.

An annual increase in phosphate fertilizers production contributes to an increase in exports. Export and import of potash fertilizers is minimal. Kazakhstan produces nitrogen and phosphorus-containing fertilizers in volumes equal to consumption, however, most of the fertilizers are exported, and domestic demand is met by imports [22].

2. Literature review

Growth of productivity and development of domestic crop production on the basis of intensification, extensive use of natural and climatic potential of the republic, land and water resources, possibilities of

new varieties is a strategic task of domestic land cultivation. The soils of Kazakhstan, with the exception of the northern regions, have a low level of natural fertility, and are subject to degradation, risk of desertification, manifestation of wind and water erosion. Most of arable land is characterized by a low concentration of humus and mobile forms of nitrogen, more than half of which are not provided with mobile forms of phosphorus, that is, they need the use of nitrogen and phosphorus fertilizers. In this connection, solution of the problem of effective use of arable land, preservation and improvement of soil fertility and, on this basis, productivity of agricultural crops in the republic, depends to a large extent on fertilizers application, the conclusion was made in the work of our Kazakh researchers : S.B. Kenenbaev, S.B. Ramazanova, E.T. Suleimenov, V.N. Gusev. «Application of mineral fertilizers in land cultivation of the Republic of Kazakhstan».

Modern agriculture is in a state of permanent agro-technological revolution. It began in the 60-s of the last century with the development of intensive agricultural crop varieties, development and dissemination of intensive science-intensive agro-technologies. The process of intensification of agriculture has covered practically all countries of the world. As a result, the average world yield of grain crops by the beginning of the new century exceeded the threshold of 3 t/ha, and in the advanced West European countries - 8 t/ha. It is important to note that in all countries the level of yield capacity directly depends on the level of application of mineral fertilizers. Currently, fertilizers are one of the main factors influencing crop productivity. Since 1950, the volume of fertilizers produced in the world has increased steadily and reached 148.8 mln.tons by the beginning of the twenty-first century. Further high growth in production and consumption of fertilizers are forecasted up to 20%/year and by 2030 their consumption can reach 180 mln.tons per year. Mainly by developing countries like India, China, Vietnam, Brazil, Mexico, Venezuela. While leading industrial countries set the task of more efficient use of the after effect of the long-term application of high fertilizer rates into soil [23].

With significant potential for effective development industrial enterprises, Kazakhstan is at the initial stage innovative industrial modernization. Main problems domestic industry is associated with low demand for manufactured products, moral and physical wear of fixed assets, especially infrastructure

facilities, technological backwardness, high costs per unit of production. The chemical industry, along with the petrochemical and mining complexes, and the electric power industry, has a decisive impact on the socio-economic development of Kazakhstan, because chemical production includes a whole range of industries. Moreover, Kazakhstan has all the necessary prerequisites for its development: rich natural resources, experience in the production of traditional types of chemical products and the presence of domestic scientific schools in the field of chemical Sciences. At the same time, outdated equipment and technologies (almost all Kazakh enterprises use technologies developed in the 70-80-ies of the last century) do not allow for the depth and complexity of processing of mineral and hydrocarbon raw materials. Except in addition, the low capacity of the domestic market also plays against the development of the industry. In order for the products of Kazakhstan's chemical plants to be competitive on the foreign market, huge investments are needed. «Report on the results of the study production of mineral fertilizers in the Republic of Kazakhstan» by LLP ARG Group for National Chamber Entrepreneurs of the Republic of Kazakhstan «Atameken» in 2017 [24].

How can I assess the effectiveness of allocating funds from the budget to subsidize fertilizers? To assess the effectiveness of state support measures in agriculture the author analyzes the degree of closeness of the relationship between the level of state support and performance indicators of agricultural enterprises commodity producers from research work of Volkov S. V. «Evaluating the effectiveness of state support measures». This method will be used in the analysis of the Kazakhstan case. The most important indicator is productivity, since its growth with limited land resources is the main factor in increasing the production of food, feed for livestock and raw materials for industry, as well as a factor in reducing costs per unit of production [25].

Subsidies to agricultural enterprises are allocated without any reference to the results of their work. Thus, it is not possible to say that the purpose of subsidies is to support agriculture or to achieve the criteria of "food security" by increasing the output of agricultural products. Rather, this goal is to support agricultural workers and rural residents in general. There is a very strong statistical relationship between the amount of agricultural subsidies per person employed in agriculture on an annual basis and

the average annual wage in this sector. This fact is an additional argument in favor of the fact that the purpose of subsidizing agriculture is to support employees of agricultural enterprises. Moreover, even the amount of subsidies shown in the state budget in terms of one person employed in agriculture exceeds the average annual salary of such an employee. This means that the amount of state support for agriculture is large enough to pay employees of agricultural enterprises an amount exceeding wages, allowing them to not work. «Agricultural subsidies in Belarus: efficiency analysis and assessment of compliance with WTO requirements» by Dmitry Babitsky [26].

The contribution of fertilizer subsidies to national food security strategies remains highly controversial. Nevertheless, such programmes have become unavoidable in the agricultural policy portfolio. They have become a widely used policy instrument, to which governments devote very large shares of their national budgets. This makes them de facto central to supporting national agricultural and food security strategies. Most of the reviewed subsidies have been successful at meeting their primary objective, raising national agricultural production and productivity. Smart schemes have brought about innovations in terms of targeting smallholders and supporting the development of private-sector-led distribution markets. «Fertilizer subsidies in sub-Saharan Africa» by Zoé Druilhe and Jesús Barreiro-Hurlé [27].

The yield of crop depends on seed, fertilizer, irrigation and management. Improved seed and quality fertilizer play important role in crop productivity. The smooth supply of chemical fertilizer under subsidy scheme and increasing amount of improved seed distribution must have played role for positive yield effect. Assured supply of fertilizer and improved seeds will have positive impact on production and productivity in Nepal. The research by Diwas Raj Bista1, Sujan Dhungel and Santosh Adhikari «Status of fertilizer and seed subsidy in Nepal: review and recommendation». This work also includes a SWOT analysis of the subsidy mechanism in Nepal [28].

In research paper «Factors of increasing efficiency of grain production and use of intensive technologies» by N. N. Zvyagina written that efficiency of agricultural production is a difficult economic category. It reflects one of the most important aspects of social production - productivity.

When characterizing the final result, it follows distinguish between the concepts of effect and economic efficiency. The effect is the result of other events held in agriculture. So, the effect of fertilizer application expressed as yield increase. However, the effect obtained does not give an idea of the beneficial use of fertilizers. Only one at a time the effect is not enough to judge the appropriateness ongoing events. More a complete answer to this question is given by an indicator of economic efficiency when comparing production results with material costs. [29].

3. Research Question and Research Hypothesis

Research question is the following: *Will the productivity of the agro-industrial complex in Kazakhstan increase with increased government support for fertilizer subsidies?*

In parallel with the question, research has several hypotheses, which are listed below.

The first hypothesis is proposed by the fact that t the subsidy mechanism funded by the budget, improve the application of fertilizers. As previously described, the problem of using fertilizer application of 5 kg per hectare is a very small norm. We will try to make an analysis of whether the amount of fertilizer application will change if the budget is increased. Chemicalization of the agro-industrial complex and increase in quantity increase the demand for mineral fertilizers. The main measure of stimulating demand is subsidizing mineral fertilizers.

Secondly, the agronomic and economic effects of fertilizers are important for increasing productivity level. The more we saturate the land with fertilizer the more crop productivity we will get.

Finally, the research question and hypothesis are useful and relevant for both agricultural workers and executive bodies. I hope that my work will bring additional knowledge and evidence to all interested parties in this study.

4. Research design

The methodology of this study will include economic and statistical research methods. To assess the effectiveness of the budget allocated to support from farmers to large farms fertilizer subsidies will be used such methods as:

1) Comparison Analysis - comparison of average yield indicators with the possible yield indicator at 100% fertilizer use. Data from the Committee of Statistics of the Republic of Kazakhstan were used for the analysis. The data includes indicators of grain, potatoes and vegetables yields between 2004-2019 years.

2) SWOT – analysis of subsidy mechanism in Kazakhstan. Identifying the strengths and weaknesses of the mechanism, assessing opportunities and threats.

3) The future scenarios of Kazakhstan's fertilizer demand development for 2030. The scenario is based on the IFA 2030 assessment method, where the results will change due to the level of development of the growth of the mineral fertilizers market and innovation. Scenario development means thinking about an alternative probable future and imagining what it could be. They return to discussing strategy, helping companies think about what could be more than what happened, and neither predict nor "plan" how the future will unfold.

4) Regression - to analyze the impact of state support on crop yields, a correlation and regression analysis will be performed. To assess the effectiveness of state support measures in agriculture, the degree of closeness of the relationship between the level of state support and indicators is analyzed efficiency of agricultural producers. The regression will include data on average wheat yield in Kazakhstan and fertilizer costs per hectare for 12 regions of Kazakhstan that cultivated wheat. The yield data in period 2009-2019 was taken from the Committee of Statistics of the Republic of Kazakhstan.

5. Findings, analysis, and discussion

The results of comparison Analysis

In the lower table, information on the Agrochemical map of mineral fertilizers shows the effect of fertilizer use on the prices of the final product-the crop.

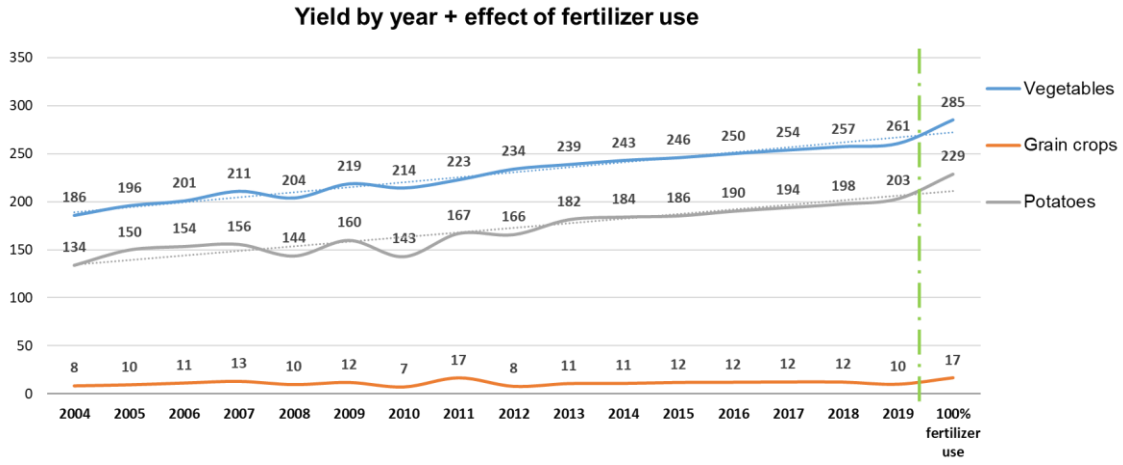
Table 3. Agronomic and economic effect of fertilizer use [16].

The crop	% of total use	Application rate		Cost of fertilizer	Productivity centner/ha	Margin from	Net profit thsd.tg/ha
		N	P				

				use thsd.tg/ha		sales, thsd.tg/ha	
Wheat	14	12	6	1,5	12,7	2,8	1,2
	25	25	12	2,7	13,2	4,9	3,5
	100	83	41	10,9	16,7	19,6	8,7
Potatoes	14	30	21	6,2	195,8	43,1	36,9
	25	64	45	11,1	200,0	76,9	65,8
	100	212	151	44,4	229,4	309,3	265,0
Vegetables	14	38	22	5,3	254,9	52,8	47,5
	25	81	47	9,5	264,7	65,9	56,4
	100	270	157	38,1	285,0	372,8	334,7

The data about yields taken for analysis is found in Annex 1.

Diagram 17. Yield by year centner/ha and effect of 100% fertilizer use with full demand of the cultivated area.



If you look at the overall dynamics, there is an increase in the average annual yield, but when using fertilizers according to the standards per hectare of agricultural land, we can get an even better result. For example, for vegetables (onion and tomatoes), the harvest in 2019 was 261 centners per hectare, if we use the required rate of fertilizer application per hectare we get 285 centners per hectare. Crop growth will increase by 9%. On potatoes in 2019 there was an indicator of 203 centners per hectare, and

at best, there would be 229 centners. Growth 13% more than the previous crop. Cereal productivity in 2019 was 10 centners per hectare, if fertilizer were used, there would be 17 centners per hectare. Possible increase of 70%.

The results of SWOT – analysis of subsidy mechanism in Kazakhstan. Identifying the strengths and weaknesses of the mechanism, assessing opportunities and threats

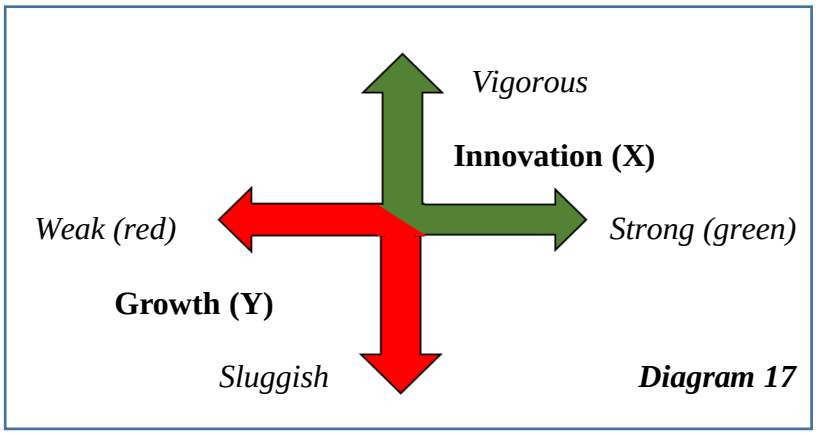
Table 4. SWOT – analysis of subsidy mechanism in Kazakhstan

Strength	***Weakness***
- Policy framework and guidelines for program implementation - The program to support subsidy in country has the regular budget allocation. - Availability of procurement procedure leading timely supply of fertilizer and seed on season. - Subsidy is unlimited for all the types of fertilizers - Support for local production of mineral fertilizers - Online format for submitting applications for fertilizer subsidies	- Insufficient number of fertilizer inspectors to control and monitor the program - The budget allocation is far below compared to the requirement of fertilizer - large fertilizer suppliers should have their own networks, suppliers, and warehouses in each region - The level of education of farmers in agricultural chemistry - The distortion of data of the state statistical accounting
Opportunity	***Threat***
- Providing trainings to produce and capacitate needed amount of fertilizer - Inspectors for regulatory works - Full electronic accounting of objects in the agro-industrial complex - The opening of new factories for the production of fertilizers - Mandatory to fill out the form on the use of fertilizer for farmers	- Price fluctuation of fertilizers in international market - No use of fertilizers may result to decline in soil health in long term - Distortion of fertilizer market due to subsidy scheme leading to dismal participation of private sector in the business - Increasing use of chemical fertilizers may result to decline in soil health in long term

The interpretation of the future scenarios of Kazakhstan's fertilizer development for 2030

Previously, the work described the work of the association of mineral fertilizers about the global forecast for 2030. Using their method, evaluating the changes in the growth of the market of mineral fertilizers and innovations help to make scenarios for Kazakhstan.

Diagram 18 . The Kazakhstan's future scenarios of fertilizers demand, depending on Growth of the market (Y) and Innovation (X).



Scenarios' description:

1) Current level - Sluggish growth, weak innovation. Kazakhstan has been paying more and more attention to the growth of the agro-industrial complex in the country. In 2030, with such parameters as slow growth with not developed innovation activities will not give us better efficiency. If the issue of using fertilizers remains unchanged, the level of soil productivity will fall and become a universal problem not only for farmers but also for the Kazakh people, the consumption of which will not converge with the need.

2) Level UP - Strong growth, strong innovation. With these parameters, better soil productivity is expected, exports may increase, new factories and new jobs will be opened for the population, and the level of agricultural education of farmers will be higher than today's level. The decrease in fertilizer prices would ease farming costs.

3) Stage of preferences - Strong growth, weak innovation. Good indicators are expected at first glance. The market will be filled with new manufacturers and distributors, new jobs. But growth with weak

innovation will give a sign to farmers about the quality of products, or farmers will be lured by foreign producers with more convenient and high-quality products.

4) Renewing all the system - Slow growth, strong innovation. With these parameters, innovative technologies in Kazakhstan will be enough to develop growth. But factors such as farmers' lack of education, lack of training programs from the state, and corruption within the country will lead to slow growth with the best technologies.

The results of correlation and regression analysis

In order to increase the yield of agricultural crops and organize coordinated work during the harvest period in the Republic of Kazakhstan subsidies are provided to agricultural enterprises producers. I used the main indicator - wheat crop, because in Kazakhstan it is a leader among crops for growing, and also when distributing the budget, we saw that the budget was more invested in those areas where wheat is grown. Annex 1 shows the average annual wheat yield for 2009-2019 and Annex 5 subsidies for crop production in 2009-2019 per 1 ha of agricultural land in the regions of the Republic. Data for 2016-2019 were taken from several sources, 2018-2019 – Qoldau.kz [30] and 2016-2017 in the news agency Kokshetau Asia article [31]. Due to the distortion of data in Kazakhstan, data by region is not available in open sources, the data were modeled using past regional distributions in Annex 4.

Regression 1. rУХ1, when X1 – Fertilizer cost per ha and Y – average yield of wheat. Period of regression is 10 years, 2009 - 2019.

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0,321311101
R Square	0,103240823
Adjusted R Square	0,096342676
Standard Error	4,516166095
Observations	132

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	305,2521943	305,2521943	14,96645632	0,000172246
Residual	130	2651,448306	20,3957562		
Total	131	2956,7005			

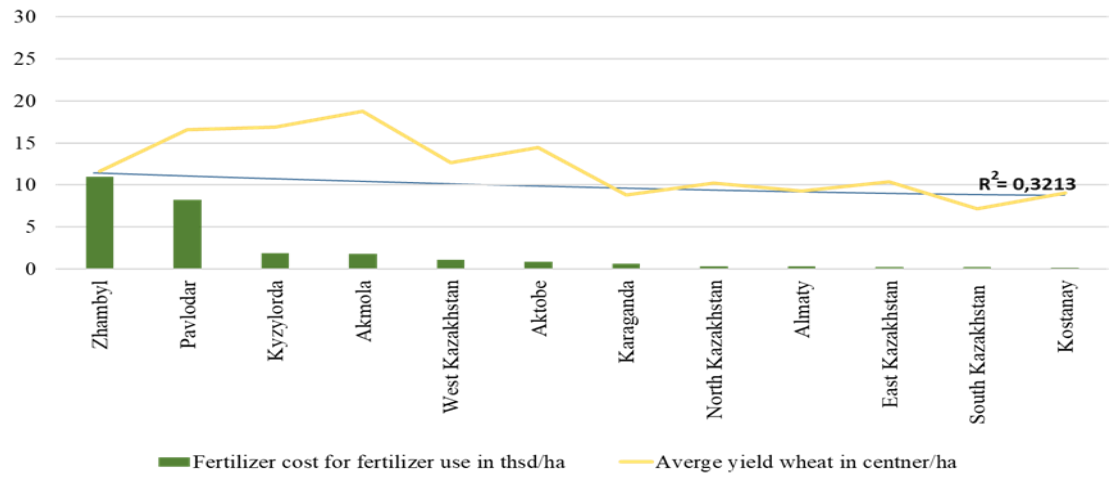
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95,0%*	*Upper 95,0%*
Intercept	11,3214185	0,448484309	25,24373377	5,87952E-52	10,43414593	12,20869107	10,43414593	12,20869107
Fertilizer cost/ha	0,0004108	0,000106187	3,868650453	0,000172246	0,000200722	0,000620877	0,000200722	0,000620877

To analyze the impact of state support on crop yields, a correlation and regression analysis was performed. As the initial data we used indicators the average annual yield of wheat in 12 districts of the

Republic, as well as information about subsidies. The initial data for correlation and regression analysis and the results of statistical processing are given in Annex 4-5. As a the average annual yield of wheat was selected as the effective indicator, and subsidies 2009-2019 were selected as a factor indicator, based on 1 ha of agricultural land in regions. To characterize the coupling strength I use the Chaddock scale. According to it, the relationship between productivity and subsidies (rУХ1 = 0.32) is direct and moderate. The coefficient of determination is 0.1032 point or 10.3% of the variation in the yield level is explained by the variation of subsidies.

The calculated values are obtained by substituting the values of the yield factor in the regression equation. Thus, to analyze the impact of state support on crop yields conducted a correlation and regression analysis. It was found that in the Republic of Kazakhstan, the relationship between the average annual yield and subsidies (rУХ1 = 0.32) is direct, moderate.

Diagram 19 . The average annual yield of wheat for 2009-2019 and the budget aimed at subsidizing fertilizers in 2009-2019 per 1 ha of agricultural land in the regions of Kazakhstan.



6. Conclusions

Based on the results of the work done, it is time to draw conclusions on the study as a whole. First, go through the hypotheses that we put forward at the beginning of the study.

First hypothesis: The subsidy mechanism funded by the budget, improve the application of fertilizers. Innovation requires an adequate perception of the problem by the state, stimulating the development of modern agricultural technologies in agriculture, scientific reproduction, and improving the level of

information support. Thus, the readiness of agriculture to use mineral fertilizers in optimal quantities will be determined by the pace of technological modernization of agriculture. In this situation, the role of the state policy in the field of agrochemical services and the creation of the necessary economic conditions for farmers, allowing them to increase soil fertility with state support. The hypothesis can be accepted, but only in right way of mechanism with innovation.

Second hypothesis: the agronomic and economic effects of fertilizers are important for increasing economic growth. The more we saturate the land the more productivity we get. In the results of regression was found that in the Republic of Kazakhstan, the relationship between the average annual yield of wheat and subsidies (rУХ1 = 0.32) is direct, moderate. But according to the world practice of using fertilizers, it has been repeatedly proven that applying fertilizers to the soil gives a good result in productivity. As on the first hypothesis, I assume that Kazakhstan needs to modernize the process of subsidizing mineral fertilizers and conducting training seminars for agricultural workers and farmers. The hypothesis accepted.

Research question was the following: Will the productivity of the agro-industrial complex in Kazakhstan increase with increased government support for fertilizer subsidies? The answer the main question of my research, yes. However, it is worth remembering that the effective use of fertilizers can only be in the general culture of agriculture.

To develop the market of consumption and production of fertilizers in Kazakhstan are necessary continuous improvement and increase effectiveness of the sowing culture of Kazakhstani farmers, the introduction of new technologies for the use of mineral fertilizers, which improve the quality of the products themselves, enrich the land and increase productivity.

At the end of my research, I hope that my work will help the following researchers to help assess the effectiveness of budgeting in other areas of agriculture. I believe that the work done will help everyone analyze the situation and evaluate the effectiveness of subsidies in our country.

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Annex 1. Productivity of grain crops (including rise) and legumes cultures 2004-2019. Available on: The Committee of Statistics

Productivity of grain crops (including rise) and legumes cultures *

centners from one hectare

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
							In total									
Republic Kazakhstan	**8,8**	**10,0**	**11,7**	**13,3**	**10,1**	**12,6**	**8,0**	**16,9**	**8,6**	**11,6**	**11,7**	**12,7**	**13,5**	**13,4**	**13,5**	**11,4**
The Akmolinsky	7,1	8,5	9,6	11,6	7,5	11,2	5,2	15,6	7,0	10,4	11,0	10,8	11,6	11,2	11,7	9,5
The Aktyubinsk	5,3	4,7	2,9	7,8	8,5	6,3	2,4	7,5	2,9	5,0	4,7	5,6	11,9	12,3	11,0	8,4
The Almaty	20,4	19,7	19,8	22,2	16,2	25,6	22,7	24,0	23,4	24,8	23,5	26,1	27,9	28,7	29,5	29,2
The Atyrausky	3,1	1,4	1,0	1,3	6,5	0,8	1,0	7,7	2,3	5,4	-	7,6	47,0	18,0	29,1	-
West Kazakhstan	5,7	3,9	6,1	8,5	13,3	5,4	4,2	9,7	5,4	6,6	7,9	6,6	14,5	15,1	7,0	9,9
The Zhambylsky	18,0	16,6	11,8	13,0	8,3	24,0	16,4	17,4	11,0	20,2	11,6	17,9	24,6	24,5	24,2	21,3
The Karaganda	6,8	3,9	6,3	8,1	5,7	7,9	4,5	10,8	6,5	11,4	9,2	9,0	12,3	9,7	11,8	9,3
The Kostanajsky	7,9	10,5	13,4	15,0	11,5	11,1	7,3	18,4	6,1	9,7	9,9	11,4	10,8	11,6	11,6	7,4
The Kyzylordinsky	32,0	30,7	30,4	31,1	30,7	33,5	38,5	34,7	34,6	37,3	38,2	42,3	46,6	45,9	46,5	53,2
South Kazakhstan	21,3	16,8	14,6	17,0	11,6	21,2	17,6	17,0	15,4	21,8	17,7	23,2	24,3	20,7	-	-
The Turkistan	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20,1	24,3
The Pavlodar	6,2	5,2	6,7	8,3	3,7	13,5	5,4	7,4	3,7	11,7	5,9	8,7	10,3	9,8	10,6	7,6
North Kazakhstan	9,3	11,2	14,5	15,1	12,4	14,5	9,7	20,9	11,7	12,8	14,6	15,8	15,7	16,3	15,5	14,4
East Kazakhstan	11,6	10,4	9,5	11,9	4,3	15,9	10,0	10,6	11,0	14,2	12,6	11,3	13,7	11,8	15,1	17,0
The city of Nur-Sultan	-	13,3	13,6	14,0	13,1	11,4	6,4	14,2	5,7	7,4	5,0	3,3	7,4	6,3	5,8	8,5
The city of Almata	11,0	10,5	8,9	9,1	7,3	7,6	8,5	10,3	4,9	-	13,5	13,2	9,4	6,9	12,3	18,2
The city of Shymkent	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8,6	13,2
							from it: wheat									
Republic Kazakhstan	**8,4**	**9,5**	**11,3**	**13,0**	**9,7**	**11,9**	**7,3**	**16,6**	**7,9**	**10,8**	**10,9**	**11,9**	**12,1**	**12,4**	**12,3**	**10,1**
The Akmolinsky	7,1	8,3	9,5	11,4	7,4	10,9	5,1	15,5	7,0	10,0	10,9	10,8	11,1	10,9	11,1	9,2
The Aktyubinsk	5,3	4,7	2,9	7,7	8,2	6,4	2,4	7,4	2,8	5,2	4,8	5,8	11,7	12,7	11,0	8,2
The Almaty	17,4	17,0	15,7	18,9	8,8	21,4	18,0	19,0	16,3	18,2	14,7	18,8	20,0	20,1	20,3	19,7
The Atyrausky	4,0	1,3	0,9	-	-	-	-	-	-	2,9	-	-	-	-	-	-
West Kazakhstan	5,6	3,9	5,9	8,5	13,3	5,8	4,4	9,5	5,8	7,1	8,8	7,8	15,6	16,2	7,7	10,8
The Zhambylsky	16,9	15,5	9,9	12,4	6,5	21,9	14,6	15,4	8,6	16,5	8,5	15,6	21,3	21,1	22,5	19,8
The Karaganda	6,9	3,9	6,3	8,1	5,8	7,8	4,6	10,8	6,5	11,5	9,4	9,2	11,9	9,6	11,9	9,1
The Kostanajsky	8,0	10,4	13,3	14,9	11,5	11,0	7,3	18,3	6,1	9,6	9,9	11,4	10,5	11,3	11,4	7,3
The Kyzylordinsky	14,4	13,4	13,8	11,8	8,7	13,2	12,4	7,8	4,7	7,1	8,8	11,0	14,9	15,1	16,8	16,3
South Kazakhstan	20,2	15,0	12,8	15,6	9,0	19,3	14,7	14,1	10,9	19,4	13,2	18,3	21,1	16,4	-	-
The Turkistan	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14,9	19,9
The Pavlodar	6,5	5,4	6,9	8,6	3,9	13,9	5,7	7,6	3,8	12,0	5,8	8,8	10,1	10,0	11,2	7,9
North Kazakhstan	9,4	11,0	14,4	15,0	12,2	14,4	9,6	20,9	11,5	12,4	13,8	15,5	14,8	16,7	15,4	14,2
East Kazakhstan	11,6	10,4	9,4	12,1	4,2	16,0	9,8	10,7	10,9	14,2	12,4	11,0	12,7	11,3	14,4	16,2
The city of Nur-Sultan	-	13,3	13,6	14,0	13,1	11,4	6,8	14,2	6,1	7,4	5,8	3,3	7,4	6,3	5,8	8,5
The city of Almata	-	12,1	-	-	-	10,7	-	-	-	-	13,0	17,7	8,0	6,9	6,1	-
The city of Shymkent	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8,6	13,4

Annex 2. Productivity of potatoes 2004-2019. Available on: The Committee of Statistics

Productivity of a potato

centners from one hectare

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Republic Kazakhstan	**134,0**	**150,0**	**153,6**	**155,8**	**143,7**	**160,0**	**143,0**	**167,2**	**165,9**	**181,5**	**184,3**	**185,5**	**190,4**	**194,2**	**197,9**	**203,4**
The Akmolinsky	107,1	125,3	129,8	137,9	83,8	130,1	83,7	127,2	108,0	132,7	134,7	134,4	149,9	166,2	185,1	186,5
The Aktyubinsk	115,0	115,4	106,7	107,0	109,6	126,7	123,3	116,5	108,9	164,2	162,1	159,5	155,6	154,5	163,4	163,1
The Almaty	154,8	156,0	158,4	159,2	160,4	165,6	167,0	169,5	175,0	176,0	178,2	181,5	183,5	185,2	186,5	192,2
The Atyrausky	107,8	112,1	116,2	120,7	124,6	119,7	125,9	130,2	136,0	142,1	124,0	136,2	130,6	128,6	128,5	138,1
West Kazakhstan	83,4	81,9	110,0	105,0	122,7	136,1	108,1	144,0	141,1	154,4	145,2	137,5	139,8	149,5	151,2	158,8
The Zhambylsky	170,0	184,9	179,1	178,8	182,1	185,8	194,0	203,3	212,7	211,3	212,8	222,0	229,3	227,1	228,0	230,8
The Karaganda	164,2	170,4	168,1	186,0	186,2	200,6	191,5	201,9	199,7	222,3	220,8	217,0	219,3	240,8	246,5	246,4
The Kostanajsky	97,7	149,6	165,1	180,2	150,2	157,4	153,7	183,5	178,0	193,7	193,6	190,8	197,2	195,7	195,3	190,5
The Kyzylordinsky	113,9	118,0	127,8	134,7	123,8	131,1	129,7	136,6	148,4	158,7	137,8	136,7	141,3	142,7	142,8	141,9
The Mangistausky	74,5	67,7	200,0	44,7	3,0	-	37,0	244,4	37,5	-	-	-	-	-	-	68,5
South Kazakhstan	136,4	155,2	153,2	157,9	158,5	151,4	152,3	156,3	166,7	168,6	168,5	172,2	175,2	175,6	-	-
The Turkistan	-	-	-	-	-	-	-	-	-	-	-	-	-	-	188,8	186,1
The Pavlodar	150,3	174,2	171,8	177,0	168,3	196,1	177,3	202,8	179,8	225,2	240,1	241,4	255,7	253,5	278,0	287,2
North Kazakhstan	123,9	163,7	166,4	167,1	156,6	170,3	98,7	184,9	177,7	183,2	191,2	191,0	189,7	183,1	167,6	179,8
East Kazakhstan	135,9	145,0	154,9	142,2	119,2	150,6	155,6	156,4	167,7	184,1	191,1	188,3	201,4	205,1	214,4	217,8
The city of Nur-Sultan	162,6	150,0	110,8	118,4	99,6	154,0	134,1	147,3	121,9	165,8	156,3	156,7	155,7	140,7	121,5	115,1
The city of Almata	196,1	197,8	197,9	155,0	155,6	155,7	156,5	156,9	164,6	159,5	159,5	159,9	149,9	158,5	162,3	154,9
The city of Shymkent	-	-	-	-	-	-	-	-	-	-	-	-	-	-	115,7	114,5

Annex 3. Productivity of vegetables 2004-2019. Available on: The Committee of Statistics

Productivity of vegetables																centners per one hectare
	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Republic Kazakhstan	**186,0**	**196,0**	**201,0**	**211,0**	**204,0**	**218,7**	**214,4**	**222,9**	**234,0**	**238,7**	**243,0**	**245,8**	**250,0**	**253,7**	**257,3**	**260,5**
The Akmolinsky	116,0	139,0	145,0	168,0	121,0	169,7	128,3	133,5	125,6	139,4	142,0	143,4	161,1	172,5	185,4	197,0
The Aktyubinsk	142,0	148,0	137,0	140,0	128,0	178,5	183,2	167,2	145,2	174,2	179,6	174,7	160,9	164,9	165,3	167,8
The Almaty	217,0	224,0	234,0	235,0	243,0	245,2	251,1	258,4	276,6	278,9	286,2	291,9	290,0	293,0	298,3	303,1
The Atyrausky	140,0	138,0	160,0	196,0	208,0	191,5	192,3	205,9	234,1	236,3	259,6	282,6	279,4	278,6	294,0	299,7
West Kazakhstan	99,0	101,0	118,0	257,0	103,0	122,8	112,7	135,0	145,0	146,7	145,4	141,9	138,7	148,3	159,3	156,7
The Zhambylsky	177,0	179,0	179,0	190,0	179,0	193,3	197,7	206,6	222,3	225,5	239,9	246,5	263,9	264,6	264,4	268,9
The Karaganda	214,0	213,0	223,0	227,0	264,0	269,2	257,2	262,7	307,1	298,8	313,7	314,0	311,6	345,2	343,3	347,0
The Kostanajsky	194,0	197,0	199,0	154,0	203,0	242,4	245,7	274,4	267,6	301,6	313,3	313,0	320,3	313,0	306,3	301,2
The Kyzylordinsky	128,0	130,0	134,0	146,0	146,0	162,2	155,4	149,4	170,8	172,5	158,3	154,3	165,8	165,2	170,2	170,8
The Mangistausky	111,0	97,0	161,0	212,0	205,0	146,2	141,6	170,2	110,1	183,3	86,1	94,9	98,2	100,6	100,6	127,9
South Kazakhstan	182,0	197,0	205,0	218,0	202,0	217,6	213,1	217,4	217,2	209,0	201,6	204,8	205,4	212,5	-	-
The Turkistan	-	-	-	-	-	-	-	-	-	-	-	-	-	-	224,5	228,6
The Pavlodar	183,0	231,0	234,0	271,0	261,0	260,3	269,3	246,1	257,3	294,4	316,0	324,6	329,3	304,7	312,2	332,8
North Kazakhstan	287,0	284,0	292,0	310,0	315,0	322,7	269,8	360,4	352,6	371,2	374,4	380,4	386,4	358,6	333,2	330,8
East Kazakhstan	202,0	211,0	213,0	114,0	203,0	229,3	220,8	230,6	251,4	252,8	260,6	256,6	276,8	276,8	284,7	283,3
The city of Nur-Sultan	207,0	278,0	264,0	311,0	216,0	190,4	275,9	142,6	219,9	249,5	220,3	213,9	182,0	167,3	153,2	150,8
The city of Almata	527,0	433,0	255,0	233,0	203,0	226,9	222,1	226,5	247,1	222,9	222,7	222,9	225,2	234,8	234,8	236,7
The city of Shymkent	-	-	-	-	-	-	-	-	-	-	-	-	-	-	127,8	128,1

Annex 4. Data calculation according to average regional distributions in 2016-2019

Year	%	2015	2014	2013	2012	2011	2010	2009
Akmola	12%	1,18	1,02	0,67	0,61	0,50	0,39	0,35
Aktobe	1%	0,08	0,07	0,04	0,04	0,03	0,03	0,02
Almaty	7%	0,72	0,62	0,41	0,37	0,30	0,24	0,21
West Kazakhstan	0%	0,03	0,03	0,02	0,02	0,01	0,01	0,01
Zhambyl	5%	0,48	0,41	0,27	0,25	0,20	0,16	0,14
Karaganda	2%	0,20	0,17	0,11	0,10	0,08	0,07	0,06
Kostanay	9%	0,89	0,77	0,50	0,46	0,38	0,29	0,27
Kyzylorda	9%	0,90	0,78	0,51	0,46	0,38	0,30	0,27
South Kazakhstan	20%	1,90	1,64	1,08	0,98	0,80	0,63	0,57
Pavlodar	4%	0,36	0,31	0,21	0,19	0,15	0,12	0,11
North Kazakhstan	25%	2,40	2,08	1,36	1,24	1,02	0,79	0,72
East Kazakhstan	6%	0,56	0,49	0,32	0,29	0,24	0,18	0,17
Total budget for subsidies	in bln.tg	9,7	8,4	5,5	5	4,1	3,2	2,9

Annex 5. Data created for the regression

Year	Region	Yield wheat	ha	Budget in bln	cost/ha
2009	Akmola	10,9	4 542,5	0,35	77,49
2010	Akmola	5,1	4 433,7	0,39	87,60
2011	Akmola	15,5	4 278,9	0,50	116,30
2012	Akmola	7,0	4 353,7	0,61	139,40
2013	Akmola	10,0	4 252,0	0,73	171,48
2014	Akmola	10,9	4 173,4	1,03	246,08
2015	Akmola	10,8	4 193,8	1,18	280,74
2016	Akmola	11,1	4 353,4	1,38	317,75
2017	Akmola	10,9	4 350,6	2,17	499,77
2018	Akmola	11,1	4 334,2	3,17	731,70
2019	Akmola	9,2	4 447,9	1,70	382,41
2009	Aktobe	6,4	791,4	0,02	29,13
2010	Aktobe	2,4	731,6	0,03	34,77
2011	Aktobe	7,4	588,5	0,03	55,39
2012	Aktobe	2,8	578,9	0,04	68,66
2013	Aktobe	5,2	491,0	0,04	89,05
2014	Aktobe	4,8	447,4	0,07	149,26
2015	Aktobe	5,8	313,4	0,08	246,06
2016	Aktobe	11,7	344,3	0,04	108,34
2017	Aktobe	12,7	389,8	0,11	275,27
2018	Aktobe	11,0	442,5	0,32	731,56
2019	Aktobe	8,2	459,9	0,14	301,65
2009	Almaty	21,4	466,7	0,21	460,18
2010	Almaty	18,0	480,0	0,24	493,71
2011	Almaty	19,0	470,5	0,30	645,34
2012	Almaty	16,3	450,5	0,37	822,02
2013	Almaty	18,2	444,9	0,41	915,41
2014	Almaty	14,7	447,3	0,62	1390,74
2015	Almaty	18,8	449,2	0,72	1599,18
2016	Almaty	20,0	455,1	0,81	1772,58
2017	Almaty	20,1	449,5	1,34	2986,65
2018	Almaty	20,3	450,2	1,51	3362,28
2019	Almaty	19,7	456,4	1,46	3194,43
2009	West Kazakhstan	5,8	622,4	0,01	16,49
2010	West Kazakhstan	4,4	533,2	0,01	21,23
2011	West Kazakhstan	9,5	394,5	0,01	36,77
2012	West Kazakhstan	5,8	407,9	0,02	43,37
2013	West Kazakhstan	7,1	355,2	0,02	54,79
2014	West Kazakhstan	8,8	321,0	0,03	92,59
2015	West Kazakhstan	7,8	260,1	0,03	131,95
2016	West Kazakhstan	15,6	215,6	0,03	155,84
2017	West Kazakhstan	16,2	250,1	0,07	283,49
2018	West Kazakhstan	7,7	277,0	0,07	254,27
2019	West Kazakhstan	10,8	251,4	0,07	288,30

2009	Zhambyl	21,9	235,5	0,14	607,38
2010	Zhambyl	14,6	239,5	0,16	659,02
2011	Zhambyl	15,4	234,2	0,20	863,48
2012	Zhambyl	8,6	239,0	0,25	1031,90
2013	Zhambyl	16,5	243,8	0,27	1112,86
2014	Zhambyl	8,5	257,7	0,41	1607,76
2015	Zhambyl	15,6	256,6	0,48	1864,54
2016	Zhambyl	21,3	266,3	0,70	2628,61
2017	Zhambyl	21,1	275,2	0,71	2576,31
2018	Zhambyl	22,5	300,7	1,00	3326,06
2019	Zhambyl	19,8	352,5	0,90	2553,44
2009	Karaganda	7,8	736,8	0,06	81,49
2010	Karaganda	4,6	746,5	0,07	88,75
2011	Karaganda	10,8	693,6	0,08	122,39
2012	Karaganda	6,5	666,5	0,10	155,33
2013	Karaganda	11,5	670,6	0,11	169,81
2014	Karaganda	9,4	701,4	0,17	247,96
2015	Karaganda	9,2	683,0	0,20	294,05
2016	Karaganda	11,9	746,5	0,16	213,93
2017	Karaganda	9,6	795,8	0,43	534,93
2018	Karaganda	11,9	833,0	0,42	508,13
2019	Karaganda	9,1	861,5	0,47	541,01
2009	Kostanay	11,0	4 465,7	0,27	59,61
2010	Kostanay	7,3	4 273,1	0,29	68,75
2011	Kostanay	18,3	4 303,0	0,38	87,47
2012	Kostanay	6,1	4 345,1	0,46	105,64
2013	Kostanay	9,6	4 395,0	0,50	114,88
2014	Kostanay	9,9	4 109,3	0,77	187,65
2015	Kostanay	11,4	4 018,8	0,89	221,57
2016	Kostanay	10,5	4 213,9	0,51	121,88
2017	Kostanay	11,3	4 194,5	0,96	227,89
2018	Kostanay	11,4	4 066,1	3,04	747,16
2019	Kostanay	7,3	3 965,1	2,39	602,40
2009	Kyzylorda	13,2	81,0	0,27	3328,68
2010	Kyzylorda	12,4	85,5	0,30	3479,71
2011	Kyzylorda	7,8	87,0	0,38	4381,51
2012	Kyzylorda	4,7	84,2	0,46	5520,18
2013	Kyzylorda	7,1	79,3	0,51	6451,09
2014	Kyzylorda	8,8	87,2	0,78	8956,16
2015	Kyzylorda	11,0	87,1	0,90	10354,10
2016	Kyzylorda	14,9	87,0	1,06	12201,15
2017	Kyzylorda	15,1	97,5	1,63	16694,36
2018	Kyzylorda	16,8	95,3	1,86	19503,00
2019	Kyzylorda	16,3	97,5	1,85	18937,97

2009	South Kazakhstan	19,3	193,8	0,57	2924,83
2010	South Kazakhstan	14,7	213,2	0,63	2933,73
2011	South Kazakhstan	14,1	213,1	0,80	3760,60
2012	South Kazakhstan	10,9	186,4	0,98	5242,03
2013	South Kazakhstan	19,4	218,0	1,08	4931,70
2014	South Kazakhstan	13,2	239,8	1,64	6846,79
2015	South Kazakhstan	18,3	255,6	1,90	7417,67
2016	South Kazakhstan	21,1	261,4	2,89	11054,32
2017	South Kazakhstan	16,4	259,4	3,24	12509,25
2018	South Kazakhstan	14,9	278,7	3,61	12933,84
2019	South Kazakhstan	19,9	285,0	3,21	11259,83
2009	Pavlodar	13,9	621,0	0,11	174,22
2010	Pavlodar	5,7	491,4	0,12	242,94
2011	Pavlodar	7,6	538,5	0,15	284,04
2012	Pavlodar	3,8	557,8	0,19	334,39
2013	Pavlodar	12,0	595,1	0,21	344,82
2014	Pavlodar	5,8	660,8	0,31	474,24
2015	Pavlodar	8,8	671,2	0,36	539,15
2016	Pavlodar	10,1	665,7	0,35	530,27
2017	Pavlodar	10,0	684,9	0,66	958,10
2018	Pavlodar	11,2	710,0	0,86	1204,99
2019	Pavlodar	7,9	784,0	0,77	977,01
2009	North Kazakhstan	14,4	3 882,3	0,72	185,04
2010	North Kazakhstan	9,6	3 901,0	0,79	203,20
2011	North Kazakhstan	20,9	3 894,3	1,02	260,80
2012	North Kazakhstan	11,5	3 841,5	1,24	322,42
2013	North Kazakhstan	12,4	3 572,2	1,36	381,40
2014	North Kazakhstan	13,8	3 273,7	2,08	635,62
2015	North Kazakhstan	15,5	3 212,9	2,40	747,87
2016	North Kazakhstan	14,8	3 219,3	2,34	727,36
2017	North Kazakhstan	16,7	3 091,0	4,68	1512,75
2018	North Kazakhstan	15,4	2 805,9	5,68	2022,54
2019	North Kazakhstan	14,2	2 873,0	4,75	1652,47
2009	East Kazakhstan	16,0	566,7	0,17	295,75
2010	East Kazakhstan	9,8	489,6	0,18	377,73
2011	East Kazakhstan	10,7	520,6	0,24	455,15
2012	East Kazakhstan	10,9	543,4	0,29	531,74
2013	East Kazakhstan	14,2	559,2	0,32	568,38
2014	East Kazakhstan	12,4	571,4	0,49	849,60
2015	East Kazakhstan	11,0	579,5	0,56	967,37
2016	East Kazakhstan	12,7	572,5	0,80	1394,59
2017	East Kazakhstan	11,3	565,4	1,50	2660,24
2018	East Kazakhstan	14,4	543,2	1,60	2945,28
2019	East Kazakhstan	16,2	549,8	1,40	2538,90