

Concept of a State Support Programme aimed at Increasing Wheat Production in Georgia

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Abstract

This paper outlines the rationale for a state-sponsored program to boost wheat production and yield, and proposes a programme based on data-driven research. Achieving a higher self-sufficiency ratio for wheat is of paramount importance for Georgia, as the country relies almost exclusively on wheat imports from Russia. Prior to commencing the project, an analysis of statistical data published by Geostat and Faostat was conducted in order to gain an understanding of the situation and recognize any underlying trends. A state support programme has been designed to advance wheat production in Georgia, with potential to increase production by an average of 28% and the self-sufficiency ratio by 11 percentage points (amounting to 29%-34% self-sufficiency) over the course of a four-year implementation period of the proposed programme.

Key words: Wheat, self-sufficiency, support, increased production

I. Introduction

Georgia's self-sufficiency ratio of wheat has been low, averaging 16% over the last five years, making it imperative to increase wheat production to ensure food security.

The spread of Covid-19 made it evident that wheat production must be increased, and in 2022, Russia's attack on Ukraine only further emphasized the need to develop the agro-food industry to guarantee the country's food security. The availability of food became a pressing concern, particularly when it came to wheat, as bread is a staple item in many people's diets.

The demand for wheat is increasing annually, which is why it is essential for Georgia, as well as other nations, to increase wheat production and decrease their reliance on imports.

Due to Georgia's reliance on the Russian Federation for its wheat imports, food security is more vulnerable than in other countries. To ensure food security, it is important to maximize local opportunities.

This study will discuss the questions of what problems and challenges are faced by Georgian wheat producing farmers, what international experience of wheat production/promotion exists, how the state should support wheat production, and what results can be expected if a wheat promotion program is implemented in Georgia.

This study seeks to create, validate and analyze the effect of a potential wheat production promotion programme in Georgia. Doing so will provide decision-makers with the pertinent data they need to employ the right policies.

This study aims to identify opportunities for increased wheat production in Georgia, investigate the most successful global practices to develop appropriate support instruments, and evaluate and set out forecasting indicators for the support program.

Data sources

The GEOSTAT agricultural survey and census of 2014, as well as FAOSTAT statistics, were utilized in the development of the wheat production promotion programme.

Research methods

Quantitative and qualitative analysis methods were employed during the research. Utilizing GEOSTAT data, production (by regions), yield (by regions), prices, cultivated areas, and access to agricultural production warehouses were analyzed. Additionally, an expert assessment method was utilized to calculate the effects of the proposed state support programme on wheat production.

Results

Given the conditions of the program, expert analysis and assumptions used to evaluate yield and production have determined that if the program is implemented, wheat production in Georgia will

increase by an average of 28%, and the self-sufficiency ratio by 11 percentage points, amounting to a range of 29%-34% within a four-year period of program implementation.

II. Conceptual Framework/Theoretical Background

This research paper explores the development of a state program for the promotion of wheat production/yield growth. To this end, an analysis of statistical indicators has been conducted, drawing upon agricultural survey data and the results of the 2014 agricultural census of Georgia. Through this analysis, various problems have been identified.

Following the identification of current issues, a program was developed with the purpose of stimulating wheat production and yield growth. Research has demonstrated that the causes of poor wheat production and yield are attributed to the availability of quality seeds, fertilizers and pesticides, crop rotation, and the utilization of related technologies. In order to achieve the goals of the wheat production promotion program, we focus on the aspects related to quality seeds, fertilizers and pesticides, access to equipment, and the enhancement of technological knowledge.

Upon developing and elaborating the concept of the program, the costs and expenses incurred were calculated based on the data of the 2014 agricultural census. Subsequently, the growth stages of wheat production were calculated and the impact was evaluated in comparison to the available data prior to the program.

The importance of wheat production - Assessment of the current situation and problems

Wheat is a significant product for food security of the country. In addition to the importance of wheat for food security, Georgia is one of the primary locations of the origin of wheat; 14 out of 27 known wheat varieties in the world have been discovered in Georgia; of those, 5 varieties are endemic and they have not been discovered in any other country of the world.

From food security perspective, it is worth noting that according to 2014-2021 data, Georgia consumes approximately up to 600,000 tons of wheat annually (Figure 1). Furthermore, Figure 1 shows total wheat utilization as well as its utilization for food and other purposes. According to the Figure 1, consumption for food accounted for almost 95% of annual wheat consumption in Georgia during 2014-2021. Figure 2 shows wheat self-sufficiency rates; during 2014-2021 they are on average 16% (over the past 4 years, steady – 15%). Hence, with its current production the country's self-sufficiency ratio is around 16%, while it is dependent on imports for 84% of wheat.

During 2014-2021, Russia accounts for 92.5% of total wheat imports to Georgia. While, in 2010-2012 Russia's share in wheat imports to Georgia was just 40-45%, with Kazakhstan and Ukraine being active players on the market during that period. From 2013, the share of wheat imports from Russia as part of total import started to grow, as reflected on Figure 3, which shows wheat imports to Georgia by years and countries. Currently the market is no longer diversified and 99% of imported wheat in Georgia is from Russia.

In 2020, during the COVID-pandemic, key grain crops exporting countries imposed various restrictions on exports; this, firstly, raised the risks of grain crops shortage in the country, and

secondly, drove up the prices of imported goods and respectively resulted in reduced accessibility of grains and grain products on the local market. This is particularly the case with wheat flour and wheat bread which accounts for high share in food consumption and has significant impact on the inflation rate as well. In response to the restrictions imposed by major exporters, importers increased wheat flour imports to prevent food crisis and the shortage of the vitally important product. According to GEOSTAT, flour imports increased by 248% in 2012, compared to prior year; this trend has been sustained and according to preliminary data of 2022, wheat flour imports have increased 5-fold. Although the country did not have the shortage for the production of wheat bread, it suffered considerable losses in the segment of fodder, since wheat imports fell by 50% this year and it was replaced by flour import. Diagram 4 shows the dynamics of wheat flour imports by years and months.

Following adaptation with the pandemic, hostilities erupted between Russia and Ukraine in February 2022. It is important to note that these two countries account for about 30% of global wheat exports. The world faced food crisis given the outlook and current situation. There were issues with transportation and prices of grain crops increased abnormally. The afore-mentioned trend was observed in Georgia as well. Figure 5 shows percentage indicator of wheat bread prices change compared to a corresponding period of the previous year; The afore mentioned has showcased the importance of increasing wheat self-sufficiency ratio by raising wheat production, and secondly, revealed the necessity of diversification of import markets.

The analysis of key grain crops indicators and assessment of current problems

It is important to note that according to GEOSTAT data area under wheat ranges between 43.6-50.5 thousand hectares during 2014-2021. Over the past 3 years a growing trend of areas under wheat has been observed; in 2021 it reached 50.5 thousand hectares and is among the highest indicators for the past 8 years. Nevertheless, the increase cannot be regarded significant since the difference with 2014 data is only 1.9 thousand hectares (4%) (See Figure 6). During 2014-2021, areas under wheat made up on average 21% of the areas under annual crops, while in 2021, it reached 24% as a result of the growing share over the past 4 years. It is worth noting that the share of areas under wheat as part of areas under annual crops is considerably higher than the share of wheat production as part of annual crops production, which is on average 14% during 2014-2021, and was 17% in 2021.

There was a three-fold increase of wheat production rate from 2014 to 2021 totaling 136 thousand tons that is 29% higher than its average production rate. The following facts should be highlighted when describing wheat production dynamics: areas under wheat increased only by 4% from 2014 to 2021; still, there was a 186% increase in its production, thanks to prominent increase of its average yield per hectare over the afore-mentioned period; although it is considerably lower as compared to the developed states; The increase of wheat production rate in 2021 is primarily due to increased yield indicator that is 17% higher than average indicator of 2014-2021; Kakheti region is leading in wheat production and the changes of wheat production dynamics is due to the changes

observed in this region. Kakheti accounts for on average 76% as part of total wheat production over the past years.

Average yield of wheat per hectare in Georgia varied between 2.2-2.6% during 2015-2020, yield data by years and countries is provided on Figure 7. Georgia's rates are considerably behind similar indicators of the EU states, as well as those of neighboring states.

The fragmentation of lands is one of the causes for low average yield per hectare rate. For instance, according to 2014 agricultural census, 65% of farms have wheat fields between 0.1 to 0.99 ha area, which is a fairly high percentage. Low pace of wheat crop development due to the fragmentation of lands is attended by the problems faced by wheat producers.

Problems and challenges faced by wheat producers

Farmers that produce grain crops (maize, wheat) were surveyed under the research – The Analysis of Key Factors Affecting the Productivity of Grain Crops in Georgia; both smallholder and large farmers were involved in the survey (a total of 30 farmers).

The following key issues have been identified as a result of the survey:

According to the survey, average yield per hectare for wheat was 3.7 tons (weighted data have been calculated according to 123 ha wheat). It should be underscored that relatively high yield was observed in large plots; in particular, the yield of the farmers with 5 ha and more wheat fields was always higher than 3 tons/ha (save exceptional case of high losses due to late harvesting).

Poor order/lack of irrigation system is a huge problem for the majority of farmers, while the moisture in soil is crucial for the germination of seed and the formation of a full-fledged roots. Wheat requires moisture throughout the growing period. The lack of moisture delays germination and suppresses tillering capacity which has negative impact on yield later. The need for moisture increases in spring, during tillering and stem elongation, it consumes the largest amount of moisture during the period before flowering when the plant develops large amount of green mass, nevertheless, majority of wheat fields in Georgia are not irrigated during this period.

The survey has also unveiled the problem of access to quality seeds. Purchasing quality seeds are associated with high costs and farmers are often unable to afford it. Furthermore, the cases of distrust due to unfavorable past experience should also be mentioned. Save exceptions, the survey has corroborated that oftentimes, yield derived from quality seeds is considerably higher than yield when wheat produced by a farmer is used for seed material.

The lack of harvesting equipment remains a significant problem in Georgia. The survey has revealed the cases of breach of agricultural deadlines due to delayed provision of mechanization services, and it has significant impact on yield.

Moreover, farmers often note the problem of access to laboratory, in various municipalities there is no laboratory for soil and seed tests and therefore farmers are compelled to travel to other municipalities for lab services; this involves additional expenses and other resources and they are often unable to use this option.

The use of fertilizers and pesticides have been listed as a major challenge. The survey has showcased that high price of pesticides reduces access to the pesticides, which, in turn, reduces yield, since wheat requires fertile, structural soils. Winter wheat shows weak development without manure and mineral fertilizers. The treating of seed is also important for preventing diseases, including fungal ones.

As part of the survey, 90% of farmers said that they do not follow the practice seeds rotation while many years of experience evidence that the worst predecessor for various crops are the identical crops, and proper crop rotation facilitates the enhancement of soil fertility and increases yield by 20-25%.

When grain crops are sown on the same field for several years without rotation, soil is deprived of nutrients, and this contributes to the spread of homogeneous weeds, spread of diseases and pests, considerably reducing yield and the quality of the harvest, therefore grain crops may be sown on the same field only for two consecutive years.

The survey has also identified the problem of windbreaks; some of the farmers indicated that there are wind breaks around their fields although they are mostly deteriorated and require improvement. Although, in the majority of cases, farmers referred to the absence of windbreaks, while the prevention of wind and water erosion and reduction of harmful impact of winds and droughts are regarded as one of the principal reserves for the yield of grain crops, since strong winds in Georgia often dry cultivated soils and sweep the topsoil layer, resulting in the destruction of plants. Windbreaks reduce wind velocity and soil erosion, protect plants that are sensitive to wind, reduce yield losses, change micro climate, have impact on air and soil temperature (soil temperature at a protected field can be several degrees higher than in an unprotected one), increase moisture content, etc.

Grain farmers still face the significant challenge of the lack of knowledge and information related to technologies. Smallholder farmers are primarily dependent on decision of neighboring farmers with respect to the time soil cultivation and harvesting. Furthermore, primarily due to costs related issues, farmers may skip one of soil cultivation phases, for instance, working-cultivation prior to sowing; this results in the deterioration of physical and chemical characteristics of soil surface that has been compacted as a result of various prior operations, furthermore, roots system development is negatively affected, soil structure, aeration is disrupted and moisture evaporates fast – particularly during drought period, all of the afore-mentioned affects yield and prime cost of produced goods.

The survey has ascertained that the quality of seed material is crucial for supporting yield increase in Georgia. In 2021 certified wheat seed production in Georgia was 1,896 tons, and certified imported seeds accounts for 27%.

About 180-200 kg wheat seed grains are required per hectare. Area under wheat was 50.5 thousand ha in 2021 in Georgia. Respectively, annual requirement of wheat seed grains is about 10,100 tons. Average price of certified wheat seed grains is GEL 1.85-2.5, while the price of non-certified wheat seed varies between GEL 1.6-1.7, which is 24% less than certified seeds. It can be said that

currently certified seeds are not used for about 80% of area under wheat (although, it should be taken into consideration that certified seed rotation next year is not envisaged.).

Costs incurred by the farmer for growing wheat

Agricultural technologies required for the production of highly productive wheat are very expensive. Figure 9 shows percentage distribution of the costs necessary for producing wheat, calculated by the Scientific Research Center of Agriculture; according to the Center, on average GEL 630-1,990 is necessary per hectare. Fertilizers and preparations account for the majority of expenses (48%), followed by the costs related to the preparation of soil, which accounts for 30%. When these costs are incurred and appropriate agricultural activities are performed, average yield should reach 5 tons/hectare. Considering 2021 price at farm gate and the afore-mentioned yield (5 tons/ha), proceeds from 1 ha wheat field is GEL 3,850, while net profit is GEL 2,050.

State programs to support grain crops

The Ministry of Environment and Agriculture of Georgia (MEPA) offers to farmers programs/projects that support agricultural products, for primary as well as processed products, and MEPA's Rural Development Agency (RDA) is in charge of planning and management of the programs/projects. It is worth noting that currently there is no program to facilitate wheat production; although, grain crops producers can get assistance under the Project for Co-Funding for Processing and Storage Enterprises.

During 2015 and 2021-2022 the afore-mentioned program had 9 beneficiaries and the total investment was GEL 17 million of this, state cost-share was 28%. The presence and development of value add and storage enterprises is significant for the development of various crops but it is the final stage of the crop production and yield increase value chain. Respectively, initial costs must be considered, and a program designed for boosting wheat production; it will become crucial for increasing wheat production and yield and will naturally drive up the demand for processing and storage enterprises.

International experience

The example of India –Technological Interventions for efficient Distribution of Wheat and Barley Seeds

The example of India is interesting since the Indian Institute of Wheat and Barley Research under the Indian Ministry of Agriculture and Farmers' Welfare established a dedicated portal where farmers registered, indicated their actual address and the amount of seed. 5,000 farmers were registered within a pre-determined timeframe, and they received high quality seeds at their sites. More than 6,000 kg wheat seeds were distributed under this system in 2020 (*Source: Director, Indian Institute of Wheat & Barley Research*).

The necessity for the afore-mentioned distribution system arose due to the pandemic, although it can be used at any time since it saves time, streamlines logistical processes, enables to determine the demand for seeds in advance. In our opinion, the afore-mentioned success story can be used for Georgia and adapted to the conditions of a relevant program. various interesting fields can be

added to the portal for policy development. It is also worth noting that this will be the best example for the development of farmers' register. We would also like to note that the program can have less beneficiaries at the beginning than in the subsequent years, when, in our view, it will become mainstream.

No-till drill – increased revenues, saved resources, environmentally friendly

No till drill technology is intensively used in wheat producing countries and is becoming increasingly popular. However, it should be noted that it requires no till drill equipment. The use of no till drill technologies reduces labor, fuel costs, i.e., operational costs are reduced, yield increases and respectively farmers' income increases. Furthermore, minimal impact on environment, sustainable use of resources and the protection of soil from erosion should be noted. As a result of the wide introduction of the afore-mentioned technology, harmful practice of burning waste that is highly detrimental to the environment can be prevented. Furthermore, initial investment for technical equipment for no till drills may be high, although it will be made up for by high yield in upcoming years, as a result of reduced fuel and labor costs.

Georgia can consider success stories and examples from around the world and introduce cost-share component for purchasing no till drill equipment in the Program for Co-Funding Equipment.

Bolivia's National Research Program on Wheat

Bolivia has an interesting approach for seed improvement. They took due account of an advice from a consultant: "Don't waste your time in local breeding programs if someone else can improve the seed for you. We are a small country and cannot afford to reinvent the wheel". The above statement may be acceptable for developing states, particularly if the purposeful use of resources is of vital importance. This does not mean that developing states should discontinue national innovations, but they certainly should not dismiss global achievements, which is a basis for further development and novelties. As a result of international cooperation, the Bolivian government was able to offer to the farmers highly improved wheat varieties resulting in boosted yield. In this case main approach is that production can be increased in the short-term period if existing modern high-quality seeds are used; this in no way excludes the support to and advancement of national scientific and research activities.

This is an interesting example for Georgia since high quality wheat seeds already tested by major local wheat producers can be purchased from the companies to be replaced by local seed producers in the long run.

Programs directed at boosting wheat production in various countries

Having reviewed various publications, we have attempted to combine those state support approaches the governments use or have used on the path of developing production. Support mechanisms are primarily directed at the supply of agricultural equipment/supplies (cost-share is mostly 50% and higher). This is followed by subsidizing certified seeds, the subsidy rate differs country by country and depends on global situation. The use of subsidized rates and offering weed and pest control packages for wheat plantations at subsidized rates. Certainly, all countries are

concurrently exerting major efforts for extension services. The afore-mentioned assistance is mostly one time, although intervention mechanisms and direction can be different country by country.

III. Proposed Wheat Production Support Program

Having analyzed the GEOSTAT data and various problems faced by the farmers, the following needs were identified: the need to promote consolidation of small farms, access to quality seeds, access to fertilizers and pesticides, crop rotation, use of relevant technologies.

From the listed problems, the proposed wheat production promotion program takes into account points related to consolidation, quality seeds, fertilizers and pesticides, access to equipment and increased knowledge on technologies.

The purpose of the wheat production promotion program is to promote the primary production of wheat in Georgia by stimulating the owners of the cultivated area of wheat (from 1 ha and above).

The objective of the program is to promote the primary production of wheat by subsidizing the cost of inputs and materials needed for wheat production.

Geographical area of program implementation: Kakheti, Kvemo Kartli, Shida Kartli (Main wheat producing regions according to Geostat data).

Duration of the program: 4 years.

Program conditions and amount of subsidy

- If the farmer owns and/or uses and/or actually owns and/or co-owns and/or co-uses a total of 1.0 ha to 9.99 ha of wheat crop areas, farmer will receive:
 - Co-financing of certified seeds, not more than 200 kg per hectare, which is 80% of the cost of seeds. Only certified and packaged seeds are subject to subsidy.
 - Co-financing of fertilizers and pesticides - 400 GEL/ha (approximately 800 to 900 GEL is spent on fertilizers and pesticides).
- Co-financing of equipment necessary for crop production and harvesting;
 - Financing is 50% of the total cost of agricultural equipment, but not more than 500,000 GEL.
 - Within the scope of the project, 10 harvesters are needed - 3,00,000 GEL.
 - Within the scope of the project, 100 trucks and 100 carriages are needed, with a total cost of 12,250,000 GEL.

potential beneficiary

- A citizen of Georgia may be a natural person who owns and/or uses or rents land from the state and/or municipality.
- The beneficiary must be of legal age.

- In order to receive the subsidy provided for in the conditions, the potential beneficiary must own and/or co-own and/or use agricultural land in Georgia totaling not less than 1.0 ha and not more than 9.99 ha.

The beneficiary is obliged to:

- to use the seeds purchased within the program only for sowing on the plot of land in his ownership and/or co-ownership and/or co-use ownership.
- The beneficiary is obliged to insure the value of the crop financed within the program.
- to register the agro-technological works in the prescribed format and submit them to the paying agency as requested.
- In case of non-fulfillment of obligations, the beneficiary is obliged to return the subsidy amount in full.

Evaluation of program impact

According to the results of the 2014 agricultural census, the number of farmers producing wheat in Georgia is 25,964, of which 74% are in the selected regions (Kakheti, Kvemo Kartli, Shida Kartli). 26% of the mentioned wheat farmers own 1.0 - 9.99 ha of wheat crop areas (Figure 10).

According to the current results, a large part of wheat farmers (24%) owns 0.1-0.99 ha of wheat sowing areas, therefore the program can support the formation of cooperatives, which will help to consolidate the land and increase the production and yield. As we mentioned, farmers with small land have a low level of yield, which is practically impossible to increase in the case of the existing land area. Accordingly, we do not consider it appropriate to help farmers with less than 0.99 ha of wheat planted area within the project. Also, large-scale farmers with more than 10 ha of wheat planted area (about 2%) do not need assistance under the program.

Based on available data and calculation results, the number of farms to be financed amounts to approximately 6.6 thousand farmers, who own approximately 15 thousand ha of wheat crop areas. According to the survey of wheat farmers, it was determined that about 200 kg of seeds and 400 GEL worth of pesticides and fertilizers are needed for 1 ha, as well as 1 tractor and loader is needed to harvest about 100 ha of wheat, and 10 harvesters can serve 15 thousand ha of wheat.

Accordingly, in Table 1, the annual and four-year total investments (including beneficiary's participation) required for the use of seeds, fertilizers and equipment per hectare are calculated in detail in GEL.

In order to forecast the output of the program, certain assumptions must be taken into account. It is a common practice that wheat yields can be augmented by 11% when high-grade seeds are utilized and modern techniques and pesticides/fertilizers can amplify production by 35% and 12% respectively. In order to assess the effectiveness of the program, we must assume that, with all other factors remaining unchanged (e.g. weather, the amount and size of plots sown that range from 0.99 ha to 9.99 ha, etc.), production will follow current guidelines and the proposed program's provided inputs would result in a 19% increase in yield. The support program is limited to farmers

with land areas between 0.99 ha and 9.99 ha, meaning the yield increase only applies to wheat production on these farms.

We used the most recent survey of agricultural farms from Geostat to evaluate the farms with the specified land area, calculating the amount of wheat they produced and their contribution to the total production. (2020 and 2021 database is not available). Analysis revealed that farmers who own an average area of land between 0.99 and 9.99 hectares account for 25% of total wheat production and make use of 28% of the total cultivated land. We estimated the production rate for the first year after the launch of the proposed programme based on the assumptions stated above. We anticipate that, due to the favorable conditions that will be created for producers and the cost reductions associated with them, they will be able to achieve the yield rate of 5 tons/ha that is proposed by the Scientific Research Center of the Ministry of Environmental Protection and Agriculture of Georgia (Table 2). This rate is consistent with the data from the Food and Agriculture Organization of the United Nations for EU member states.

Considering the assumptions given and making use of the data from agricultural farms, we were able to assess the influence of the program (Graph 11). If the proposed wheat support program is launched, the average annual growth of wheat production will be 25%, and the self-sufficiency ratio will rise by an average of 11 percentage points to a range of 29%-34%.

IV. Program Results

If the proposed program to boost wheat production is put into effect, it is estimated that wheat production in Georgia will increase by 25%, the self-sufficiency rate will go up by 11 percentage points, and this should be attainable within four years. This would bring the self-sufficiency rate to a range of 29%-34%.

V. Conclusions

The low wheat self-sufficiency ratio (16%) and the lack of market diversification both increase the risk of wheat accessibility problems during critical times, as 92%-97% of wheat is imported from Russia.

Wheat farmers face a number of issues which can disrupt proper agricultural practices and reduce yields. These include limited access to equipment, high prices of pesticides which limit their availability, a lack of access to quality seeds, and a lack of knowledge and information about modern technologies.

The proposed wheat production promotion program can help farmers address the issue at hand and enable the country to become more self-sufficient. This could be especially beneficial in times of crisis, when the country needs to have a sufficient supply of essential goods, particularly wheat.

VI. Acknowledgment

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VII. References

2014 Agriculture Census and Agricultural Survey of GEOSTAT, retrieved from following webpages:

<https://geostat.ge/media/39766/Consumer-Price-Detail-Indices-%28The-same-month-of-the-previous-year%3D100%29.xlsx>

<https://www.geostat.ge/en/modules/categories/196/agriculture>

<https://www.geostat.ge/en/modules/categories/297/food-security>

<http://census.ge/en/results/agro-census>

<http://ex-trade.geostat.ge/en?fbclid=IwAR3JKk4-Yz9aUnbTIMrf-soswhZms8Wdd7zX9QFMscGBnO5FVvAqJCZiNek>

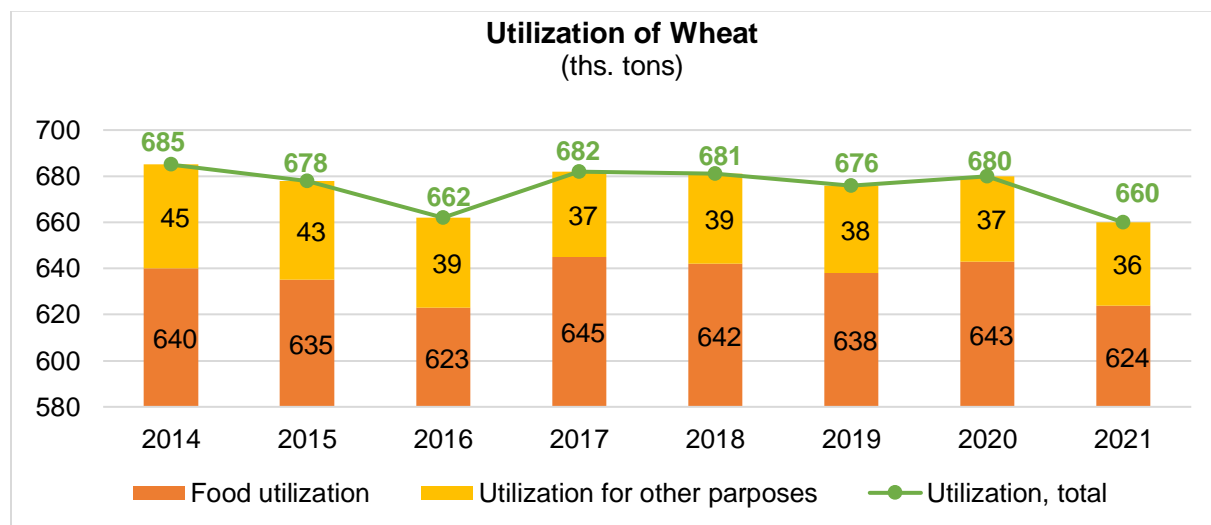
<https://www.geostat.ge/en/modules/categories/686/agriculture-holdings-surveys>

http://www.fao.org/3/ak339e/ak339e00.htm?fbclid=IwAR1oCy2uKx3p8V0A1ARhOc3pWVbYqKhWJi95WHpJFn_oBFKX4Lf_y121NF0

FAOSTAT data of the Food and Agriculture organization retrieved from <http://www.fao.org/faostat/en/#data>

VIII. Figures and Tables

Figure 1.

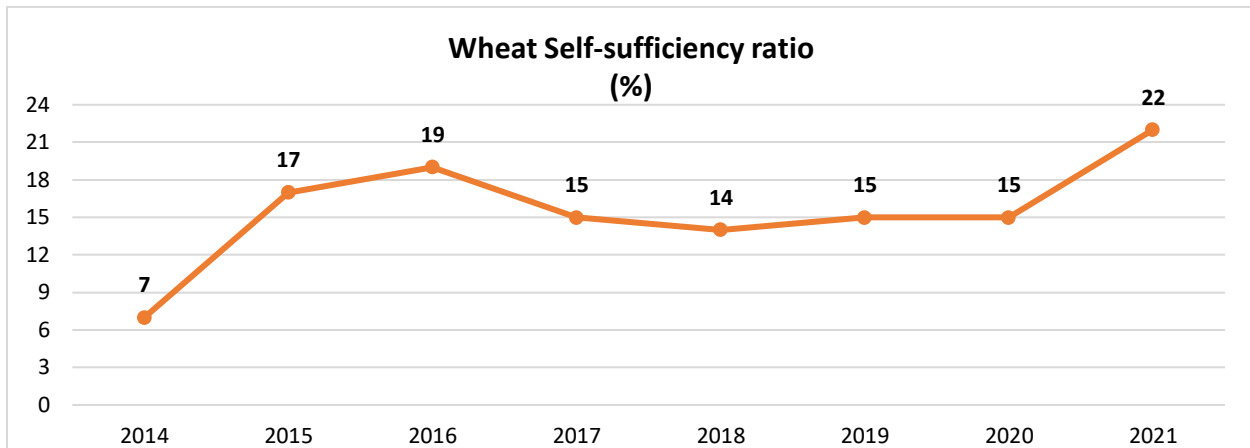


The X axis shows years, while the Y axis shows wheat utilization in thousand tons.

Source: Geostat



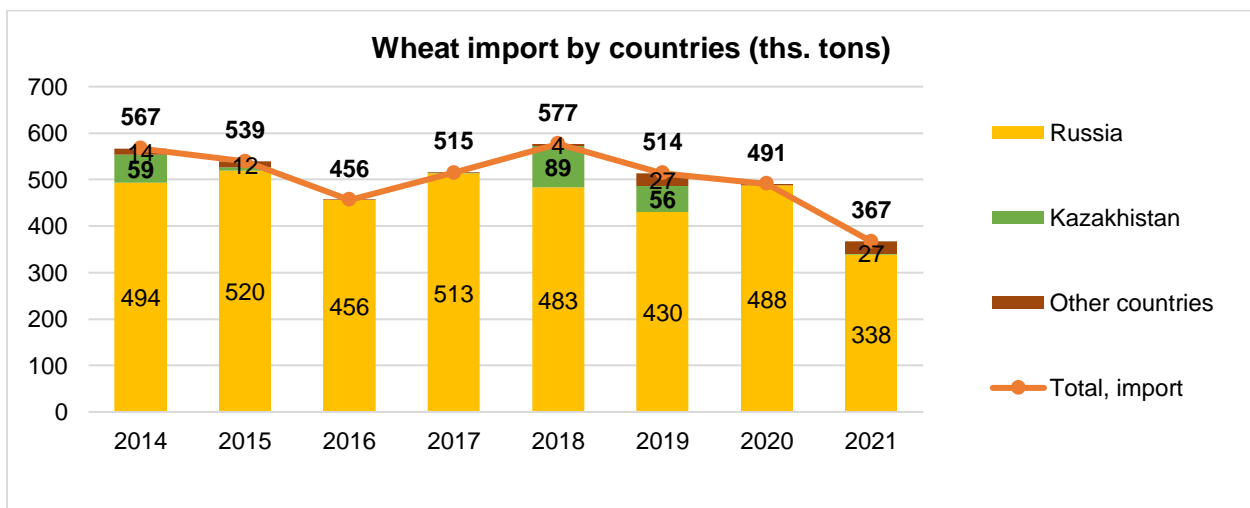
Figure 2.



The X axis shows years, while the Y axis shows wheat self-sufficiency ratio in %.

Source: Geostat

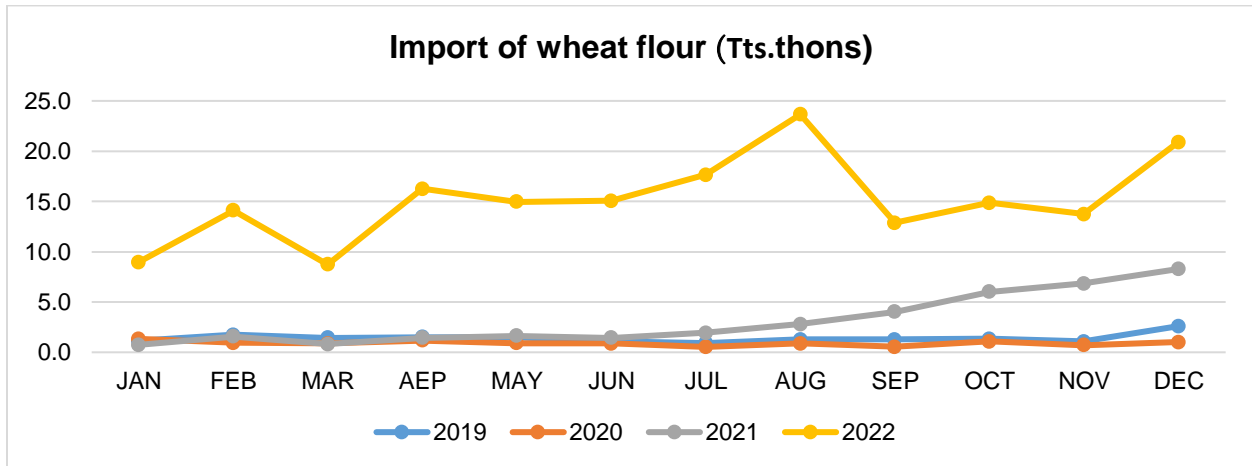
Figure 3.



The X axis shows years, while the Y axis shows wheat imports in thousand tons.

Source: Geostat

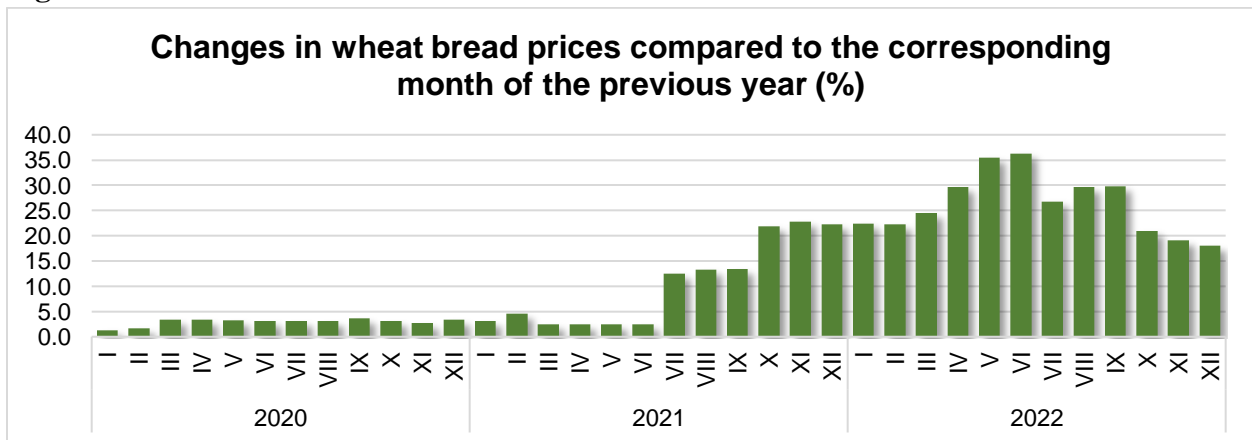
Figure 4.



X axis shows tons while Y axis shows months.

Source: Geostat

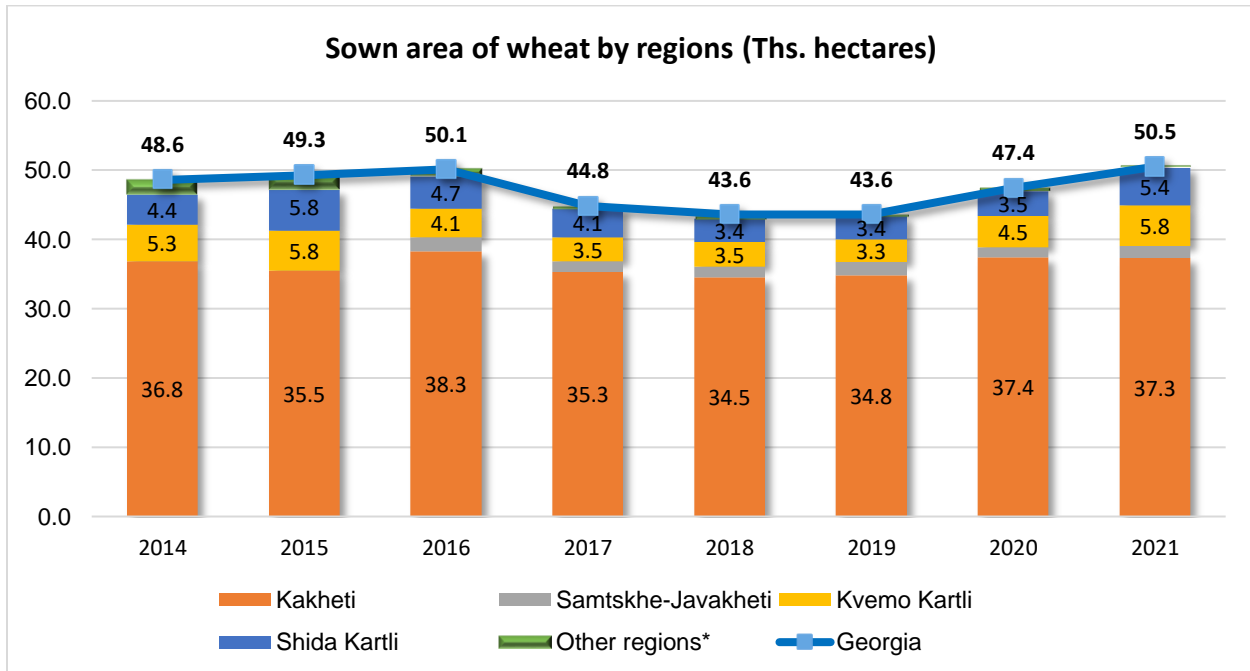
Figure 5.



X axis shows period by years and months, and the Y axis - percentage rate.

Source: Geostat

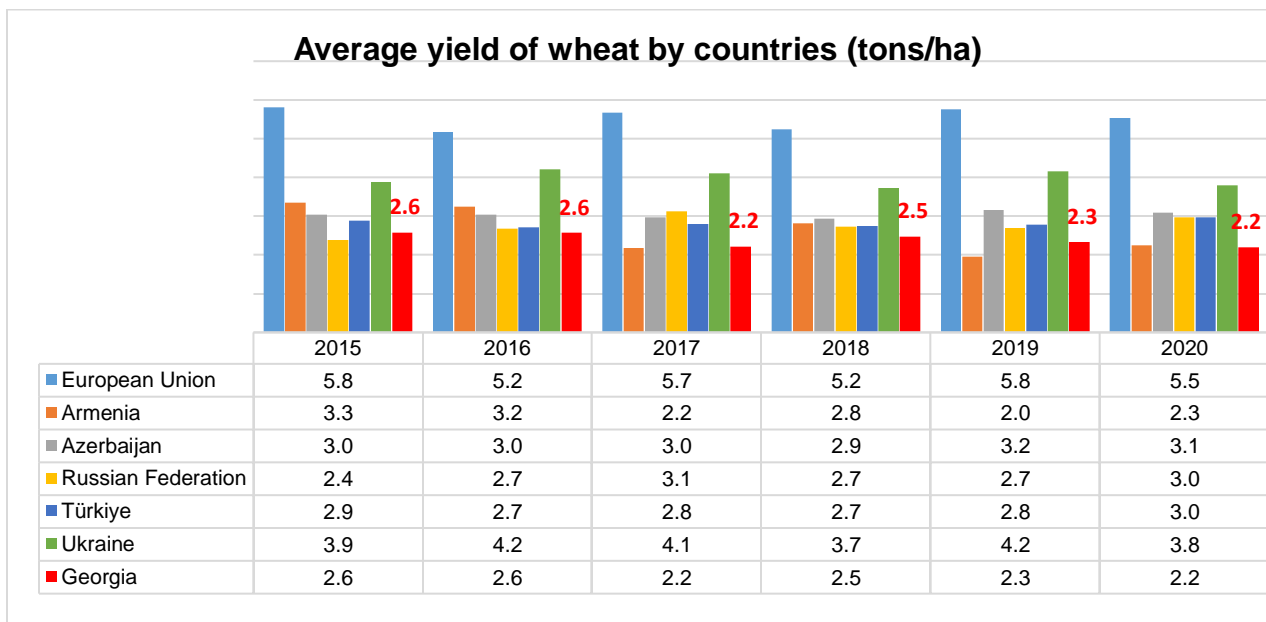
Figure 6.



X axis shows years, Y axis shows thousand hectares

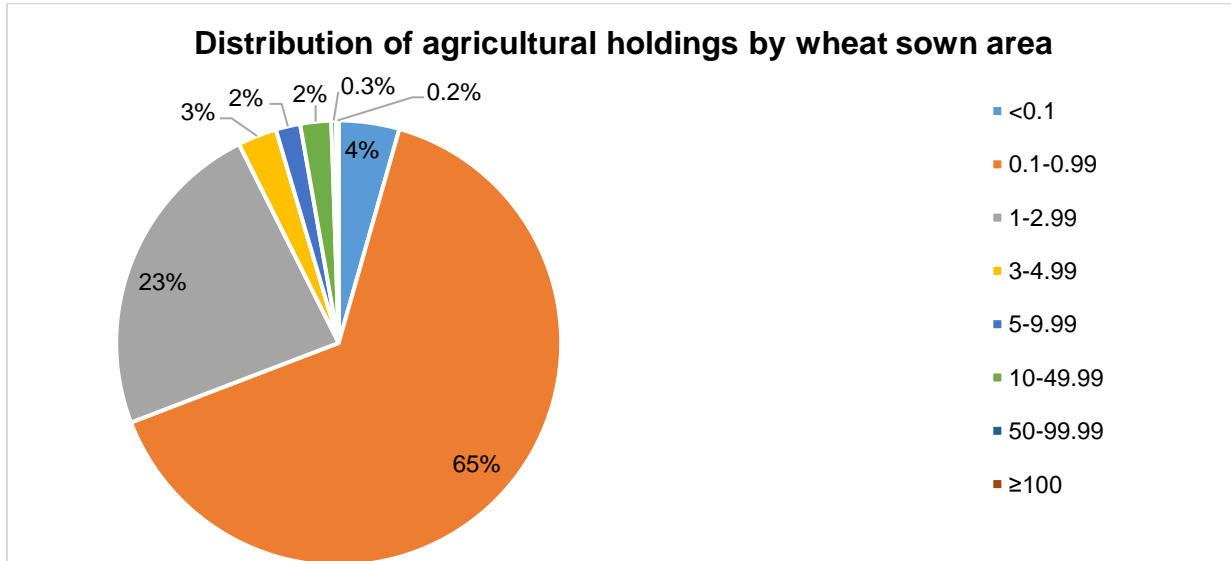
Source: Geostat

Figure 7.



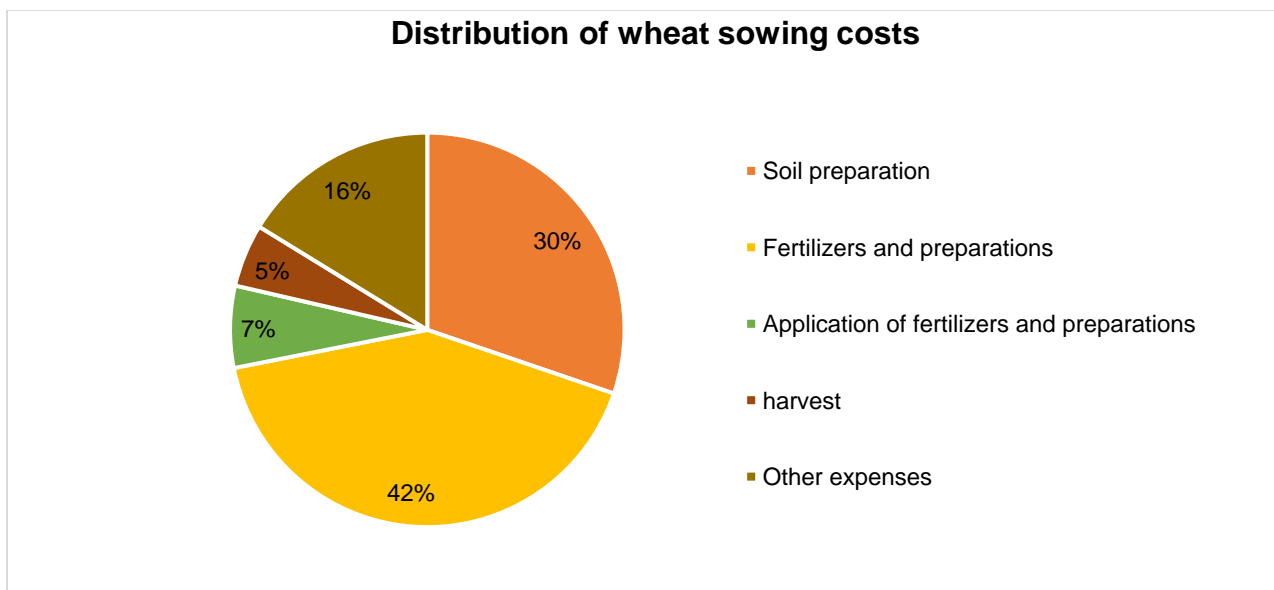
Source: FAOSTAT

Figure 8.



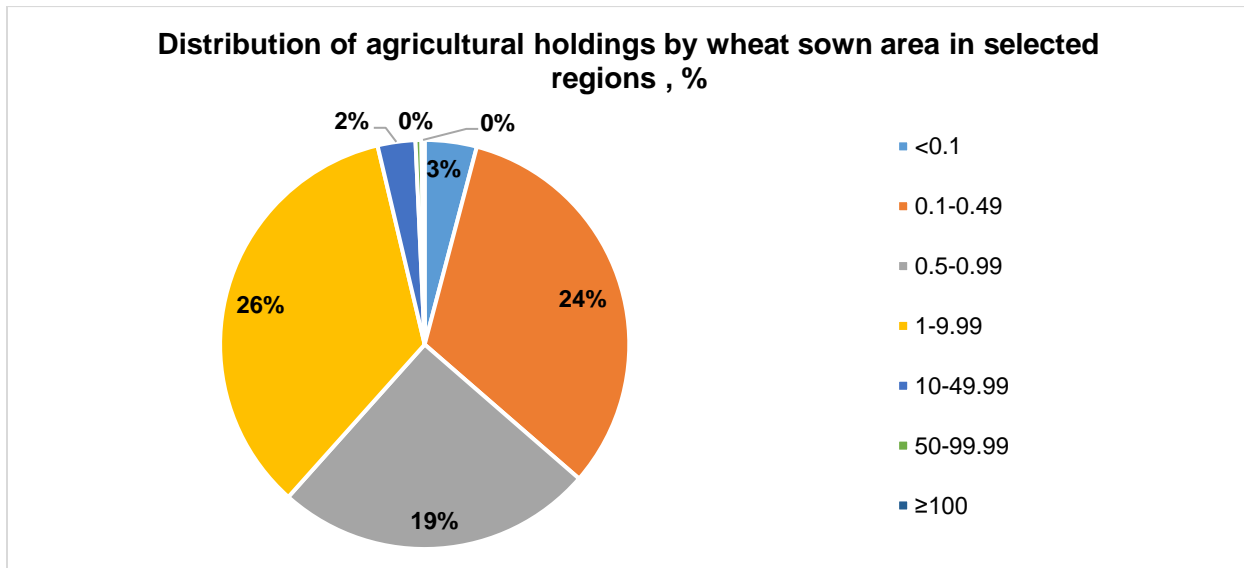
Source: Agricultural Census, Geostat

Figure 9.



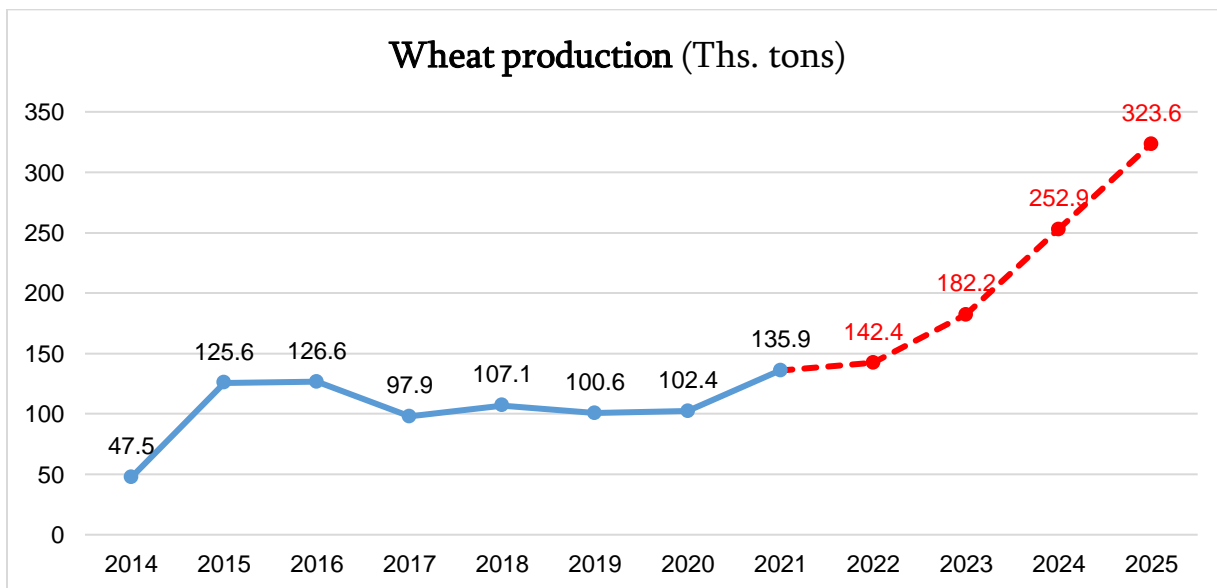
Source: scientific-research center of agriculture

Figure 10.



Source: 2014 Agricultural Census Results, Geostat

Figure 11.



The X axis shows years, while the Y axis shows wheat production in thousand tons.

Source: 2014-2021 Geostat, 2022-2025 Expert assessment during the program implementation period.

Table 1

Wheat Support Program (GEL)	
1 year total investment for seed	7,200,000
Including:	
Beneficiary participation	1,440,000
4 years investment	28,800,000
Use of pesticides and fertilizers	12,000,000
Including:	
Beneficiary participation	6,000,000
Total investment for co-financing of machinery	15,250,000
Including:	
Beneficiary participation	7,625,000
Total Investment	27,970,000

Table 2.

Year	Production	Yield	EU_Yield
2006	69.70	1.20	4.85
2007	74.90	1.70	4.66
2008	80.30	1.70	5.44
2009	53.90	1.10	5.21
2010	48.40	1.00	5.07
2011	96.80	2.10	5.15
2012	80.70	1.70	5.06
2013	81.00	1.80	5.46
2014	47.50	1.40	5.67
2015	125.60	2.60	5.81
2016	126.60	2.60	5.17
2017	97.90	2.20	5.68
2018	107.10	2.50	5.24
2019	100.60	2.30	5.76
2020	102.40	2.20	5.55
2021	135.90	2.70	5.75
2022*	142.36	5.00	-
2023*	182.21	5.00	-
2024*	252.91	5.00	-
2025*	323.61	5.00	-

