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STRUCTURAL CHANGES IN GRAIN GROWING IN SAMARKAND REGION: AN ANALYSIS OF THE GROWTH OF FARMS AND DECREASE IN THE SHARE OF PEHKAN FARMS (ON THE EXAMPLE OF 2019-2020)

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Abstract:
This article is devoted to the analysis of the dynamics of grain production in Samarkand region for 2019-2020. On the basis of comparative analysis of official statistical data, changes in production volumes (in tons) and growth rates (%) by economic categories (farms, peasant farms, agricultural enterprises) and administrative territories (cities and districts) have been studied. The results of the analysis showed an increase in the total grain production (13.1%) during this period, mainly due to a significant increase in the share of farms (17.4%). On the contrary, there was a sharp decrease in the share of peasant farms (19.7%), while a moderate (15.7%) growth was observed in agricultural enterprises. The analysis also revealed significant inter-regional discrepancies: some districts recorded very high growth rates, while in other regions, production declined. The results indicate that the region is undergoing a structural shift towards larger farms in the grain growing sector and underscore the need for a differentiated agrarian policy, taking into account the divergent trends by farm categories and regions.

Keywords: Grain production, agriculture, Samarkand region, Uzbekistan, dynamics, farms, dehkan farms, agricultural enterprises, comparative analysis, territorial disparities, growth rates, food security.

Introduction

In the context of a steadily growing global population and intensifying climate change, ensuring food security remains one of the most pressing issues on the global agenda. In this process, grain products become strategically important, as

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they form the basis of the human diet, serve as a fodder base for livestock, and are a raw material for many industries. For Uzbekistan, as well as for many countries of the world, achieving grain independence and sustainable satisfaction of the population's needs for basic types of food is an important condition for economic and social stability. During the years of independence, Uzbekistan has implemented large-scale reforms in agrarian sphere, changed the relationship of land ownership, adopted a number of programs aimed at developing agriculture on the basis of market principles. One of the main goals of these reforms was modernization of agricultural production, development of farming movement and, as a consequence, increase and increase productivity of food, namely grain products.

One of the important directions of agrarian reforms in Uzbekistan was liquidation of the system of large collective farms (collective farms and sovkhozes) left of Soviet times and the introduction of new forms of economic activity corresponding to market economy. As a result, farms, dehkan farms and other types of agricultural enterprises were formed as the main subjects of agricultural production. Farms are usually entities with the status of a legal entity specializing in the cultivation of commodity agricultural products on long-term leased land, while peasant farms are small farms with household land, mainly based on family labor, producing products for their own needs and partly for the market. Agricultural enterprises, on the other hand, may include larger agrofirms, companies, and other organizations of various forms of ownership. The role and contribution of these economic forms to gross agricultural product, including grain production, has changed over the years, and this dynamic is an important indicator of the effectiveness of the country's agrarian policy, as well as socio-economic processes in rural areas.

Samarkand region is one of the leading regions of Uzbekistan with an ancient peasant culture with a high agrarian potential. The soil-climatic conditions of the region, the level of water availability (although in some areas there is a shortage of water) are considered favorable for growing a large number of agricultural crops, including grain. Samarkand region traditionally makes a significant contribution to the country's grain threshing, and the agrarian sector, in particular grain growing, plays an important role in the economy of the region. The fact that the bulk of the population lives in rural areas and their standard of living is largely dependent on agrarian production also increases the socio-economic importance

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of the issue of grain growing for the region. Therefore, the study of the volume of grain cultivation in the region, its dynamics and structural changes is an important scientific and practical task.

However, in recent years, certain trends and problems in the field of grain growing in the Samarkand region have been observed. Preliminary analysis of available statistical data shows that although there was an increase in the total grain production in the region (for example, in 2020 an increase of 13.1% compared to 2019 was recorded (Department of Statistics of Samarkand region, 2021)), this growth was unevenly distributed among different categories of farms. In particular, grain production by farms increased significantly (17.4% growth), while a sharp decrease in production (19.7% decrease) was observed on peasant farms (Department of Statistics of Samarkand region, 2021). This circumstance testifies to structural changes in the agriculture of the region, in particular, the role of farms in grain growing is increasing, while the contribution of traditional peasant farms is decreasing. It is necessary to study in depth the fundamental causes of this trend (for example, the redistribution of land in favor of farms, limited opportunities for peasant farms to access resources, changes in market conditions, etc.) and its long-term economic and social consequences.

In addition, changes in grain cultivation are not uniform in the context of different administrative-territorial units (cities and districts) of the region. In some districts (for example, Akdarya, Kushrabat, Kattakurgan districts) in the period 2019-2020 there was a very high increase in grain production (157.3%, 139.2%, 127.2%, respectively), while in other regions (Samarkand city, Samarkand district) a decrease was recorded (Department of Statistics of Samarkand region, 2021). In Kattakurgan, grain was not grown at all in 2020. The presence of such sharp territorial disparities indicates significant differences in the efficiency of the use of agrarian resources, the policy of specialization of territories, investment attractiveness and the influence of local conditions (soil fertility, water supply, infrastructure) on production. Identifying the factors of these territorial imbalances and looking for ways to mitigate them is one of the important tasks of regional agrarian policy. At the same time, the existing scientific literature and research cover to some extent such issues as changes in the agrarian sector of Uzbekistan, the development of the farming movement, especially on the example of Samarkand region, there are relatively few special studies that comprehensively and comparatively analyze the dynamics of grain growing in

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the most recent period (in particular, 2019-2020) by economic categories and districts. Many studies are based either on nationwide generalizations or on general trends covering longer years. However, it is important to study in detail the recent past changes based on specific statistical figures (Department of Statistics of the Samarkand region, 2021), albeit in a short term, to assess the direct results of changes in agrarian policy and market conditions. It is only filling this gap, that is, an in-depth analysis of the state of grain growing in the Samarkand region in 2019-2020, that determines the main scientific novelty and necessity of this research work.

The results of this study may be important in several ways. First, it can serve as a valuable source of information for agencies developing and implementing agrarian policy at the provincial and republican levels. In particular, it is possible to use the research conclusions to stimulate farm growth, to use differential approaches to solve the problems faced by peasant farms, to develop measures aimed at reducing territorial imbalances. Second, the results of the study will help to make practical recommendations for improving the efficiency of grain cultivation in the region, rational use of resources and further strengthening food security in the pastry. Thirdly, from a scientific point of view, this study enriches the existing knowledge about the processes of agrarian transformation, evolution of economic forms and their influence on agricultural production in the conditions of Uzbekistan. It provides empirical material for making more general theoretical conclusions or testing hypotheses, especially through a detailed analysis of short-term changes in the case of a particular area. This will lay the groundwork for even broader and deeper research in the future.

Based on the above, the **main purpose** of this study is a comparative analysis of the dynamics of grain production and growth rates in the Samarkand region in 2019-2020 by economic categories (total, farms, peasant farms, agricultural enterprises) and administrative-territorial units (cities and districts). The study aims to seek answers to the following key questions:

- How has the total grain production in the Samarkand region changed from 2019 to 2020 and what are the quantitative indicators of this change?
- What are the dynamics of the contribution and growth rates of farms, peasant farms and agricultural enterprises in grain production during this period? In particular, how did the trends differ between farms and peasant farms (Department of Statistics of Samarkand region, 2021)?

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- Which districts and cities in the province had the highest and lowest rates in terms of increase or decrease in grain production? How did these territorial differences manifest themselves in the cross-section of economic categories (Department of Statistics of Samarkand region, 2021)?
- Is the decrease in grain production on peasant farms a common phenomenon on a regional scale or is it specific to certain regions? Is it possible to advance initial hypotheses about the potential causes of this trend?

Methodology

This study is devoted to the study of the dynamics of grain production in Samarkand region, one of the regions with high agrarian potential of Uzbekistan. Grain products are the strategic basis of food security in the country and province. In the context of the ongoing reforms in agriculture, changes in land relations and diversification of forms of farming (in particular, the activities of farms and peasant farms), the analysis of changes in the volume and structure of grain cultivation acquires an important scientific and practical value. In recent years, the role of private farms has been increasing, and the role of peasant farms is changing. An assessment of the impact of these changes on the province's overall grain growing capacity, inter-regional disparities, and agrarian policy determines the primary relevance of this study. In particular, by studying the short-term dynamics between 2019 and 2020, it is possible to identify the recent past trends and draw preliminary conclusions on future directions for development.

The main purpose of the study is a comparative analysis of the dynamics of grain production in the Samarkand region in 2019-2020 in the context of economic categories (total, farms, peasant farms, agricultural enterprises) and administrative-territorial units (cities and districts). To achieve this goal, the following tasks were identified:

➢ Determination and evaluation of changes in total grain production in Samarkand region in 2019 and 2020.

➢ Analysis of grain production volumes and their contribution to the total volume by each farm category (farmers, farmers, q/x enterprises).

➢ Calculate and compare growth rates for each farm category from 2019 to 2020.

➢ Determination of differences in grain production volumes and growth rates by breakdown of cities and districts of the region.

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➢ Identification of farm categories and territories that have had the greatest impact on changes in grain cultivation volumes.
➢ Creating the ground for initial conclusions and discussions based on the observed trends (e.g., increase in farm share and decrease in peasant farm shares).

Design and approach of the study

The study was based on quantitative analysis, in which secondary data sources were used. The main approach is comparative and descriptive analysis. Because the two-year (2019 and 2020) data were compared, the study had short-term longitudinal (longitudinal) elements. The study design aims to describe the changes over a set period and differences between different groups (farm categories, regions) based on available statistical data.

Деҳқончилик маҳсулотлари ишлаб чиқариш
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№	Ҳудудлар	СОАТО	Барча тонфадаги хўжаликлар			шу жумладан:								
						фермер хўжаликлари			деҳқон хўжаликлари			қишлоқ хўжалик корхоналари		
			2019 й.	2020 й.	Ўсиш суръати, %	2019 й.	2020 й.	Ўсиш суръати, %	2019 й.	2020 й.	Ўсиш суръати, %	2019 й.	2020 й.	Ўсиш суръати, %
	Самарқанд вилояти	1718	**756 040,0**	**855 179,0**	**113,1**	**657 620,0**	**772 306,0**	**117,4**	**87 656,0**	**70 421,0**	**80,3**	**10 764,0**	**12 452,0**	**115,7**
1	Самарқанд ш	1718401	803,0	712,0	88,7	0,0	0,0	0,0	5,0	17,0	340,0	798,0	695,0	87,1
2	Каттақўрғон ш	1718406	1,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	1,0	0,0	0,0
	туманлар:													
3	Оқдарё	1718203	82 379,0	129 617,0	157,3	69 055,0	118 686,0	171,9	10 863,0	7 996,0	73,6	2 461,0	2 935,0	119,3
4	Булунғур	1718206	54 489,0	56 552,0	103,8	48 538,0	50 949,0	105,0	5 673,0	5 299,0	93,4	278,0	304,0	109,4
5	Жомбой	1718209	79 000,0	82 582,0	104,5	69 939,0	73 801,0	105,5	6 639,0	6 658,0	100,3	2 422,0	2 123,0	87,7
6	Иштихон	1718212	59 074,0	61 036,0	103,3	49 145,0	53 481,0	108,8	9 437,0	7 297,0	77,3	492,0	258,0	52,4
7	Каттақўрғон	1718215	83 492,0	106 224,0	127,2	69 924,0	92 752,0	132,6	12 928,0	11 962,0	92,5	640,0	1 510,0	235,9
8	Қўшробод	1718216	10 938,0	15 231,0	139,2	10 328,0	14 873,0	144,0	544,0	325,0	59,7	66,0	33,0	50,0
9	Нарпай	1718218	41 983,0	42 391,0	101,0	34 528,0	36 453,0	105,6	7 135,0	5 937,0	83,2	320,0	1,0	0,3
10	Пойариқ	1718224	76 676,0	83 936,0	109,5	68 819,0	77 815,0	113,1	7 833,0	6 049,0	77,2	24,0	72,0	300,0
11	Пастдарғом	1718227	110 016,0	120 009,0	109,1	101 472,0	113 127,0	111,5	8 392,0	6 701,0	79,8	152,0	181,0	119,1
12	Пахтачи	1718230	39 933,0	40 061,0	100,3	30 370,0	31 657,0	104,2	7 581,0	5 420,0	71,5	1 982,0	2 984,0	150,6
13	Самарқанд	1718233	15 953,0	12 618,0	79,1	14 694,0	11 714,0	79,7	649,0	430,0	66,3	610,0	474,0	77,7
14	Нуробод	1718235	32 763,0	34 260,0	104,6	28 954,0	30 103,0	104,0	3 428,0	3 407,0	99,4	381,0	750,0	196,9
15	Ургут	1718236	41 432,0	41 711,0	100,7	38 597,0	38 982,0	101,0	2 835,0	2 729,0	96,3	0,0	0,0	0,0
16	Тойлоқ	1718238	27 108,0	28 239,0	104,2	23 257,0	27 913,0	120,0	3 714,0	194,0	5,2	137,0	132,0	96,4

(Department of Statistics of Samarkand region, 2021).

Variables and their analysis The following key variables were analyzed in the study:

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Dependent variable: Grain production volume (in tons). This is the main result indicator, its variation by years, regions and farm categories was studied.
Independent variables (grouping factors): Year (2019 and 2020): shows dynamics over time.

- Region (province, city, district): Used to analyze geographic differences.
- Farm category (total, farmer, peasant, q/x enterprises): Provides an analysis of the institutional structure of production.

Calculated variable: Growth rate (%). This indicator is calculated (or given ready-made in the table) by the formula [(volume of 2020 - volume of 2019) / volume of 2019]] * 100%, reflects the intensity of the change.

Analysis Methods The following methods were used to analyze the data:

1. **Descriptive statistics:** Total production volumes , absolute changes (in tons) and relative changes (as a percentage of growth rates) were calculated and summarized for each year, territory and economic category. Attention was paid to total and average indicators to show key trends.
2. **Comparative analysis:**
   - By time: the indicators for 2020 compared with the indicators of 2019.
   - By farm categories: The share of farmers, peasants and agricultural enterprises in total production and their growth rates were cross-compared.
   - By region: The districts with the highest and lowest growth rates were identified and the differences between them were analyzed.
3. **Analysis of growth rates:** Particular attention was paid to the absolute values of growth rates and sharp changes in them (for example, high growth in Akdarya district or sharp decrease in peasant farms in Taylyak district).
4. **Econometric Model Possibilities (Limited):** Since the data cover a short period of time, as noted in the "Results and Discussion" section, it was considered as an idea that instead of complex econometric modeling, it was possible to construct a simple regression model aimed at estimating the effects of different farm category changes on overall production change (Δ Umumiy_i = β_0 + $\beta_1\Delta$ Fermer_i + $\beta_2\Delta$ Dehqon_i + β_3*Δ Korxona_i + ε_i). However, the statistical limitations of this model have also been acknowledged in the methodology.

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Limitations of the study: This research methodology has certain limitations:

- **Time frame: The** analysis covers only two years (2019-2020). While this allows you to identify short-term trends, it is not enough to assess long-term dynamics, stability, or cycles.
- **nature of the data:** Based solely on quantitative data (production volume). The reasons for the observed changes (for example, a decrease in production in peasant farms or factors of a sharp increase in some districts) have not been analyzed in depth within the framework of these data. This will require the involvement of additional qualitative studies or other economic indicators.
- **Limitations of econometric analysis:** The number of observations (16 regions * 2 years = 32 total follow-ups, but only 16 differences in the analysis of variations) and the short time interval limit the use of complex and statistically robust econometric models.
- **Scope of Focus:** The analysis focuses only on grain products and does not cover other important sectors of agriculture in the region.

Despite these limitations, the methodology used allowed to achieve the set goals and objectives, identify the main trends in grain growing in the Samarkand region for 2019-2020, significant changes in the context of economic categories and regions, as well as create a factual basis for preliminary discussions.

Results and Discussion

Comparative analysis of grain production in Samarkand region by farm categories (2019-2020)

Xo'jalik Toifasi	Production in 2019 (tons)	Production in 2020 (tons)	Mutlaq O'zgarish (tonna)	Relative Change (%)
Fermer xo'jaliklari	657,620	772,306	**+114,686**	**+17.4%**
Agricultural enterprises	10,764	12,452	**+1,688**	**+15.7%**
Peasant farms	87,656	70,421	**-17,235**	**-19.7%**
As a whole region	**756,040**	**855,179**	**+99,139**	**+13.1%**

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According to the results of the analysis, the total grain production in Samarkand region in 2020 increased by 13.1% or 99,139 tons compared to 2019 and amounted to 855,179 tons. This increase mainly **falls on the contribution of farms**. Grain production in them increased by 17.4 percent (from 657,620 tonnes to 772,306 tonnes). **The** volume of grain grown by agricultural enterprises also increased by 15.7 per cent (from 10,764 tonnes to 12,452 tonnes). However, there was a significant decrease in production volumes on farms, i.e., by 19.7 per cent (from 87,656 tonnes to 70,421 tonnes). This indicates that the role of farms in grain growing in the province has increased, while the share of peasant farms has a tendency to decrease.

Analyzing by regions, the highest growth rates were recorded in **Akdarya** (157.3%), **Kushrabat** (139.2%) and **Kattakurgan** (127.2%) districts. In particular, in Akdarya district, the increase in production in farms by 171.9% was the reason for the overall sharp growth. On the contrary, production volumes decreased in Samarkand city (down 88.7%) and Samarkand district (down 79.1%). In Kattakurgan, grain was not harvested at all in 2020 (in 2019 it was 1 ton).

In some districts, an interesting dynamic was observed in terms of economic categories. For example, **in Taylyak** district, grain production on farms increased by 120.0%, while in peasant farms this indicator decreased sharply, reaching only 5.2%. This circumstance may indicate that in some regions peasant activities are being transformed in favor of farms.

While the data provided (two years and multiple regions) are of a panel data nature, only two years of observation is insufficient to reliably evaluate complex econometric models (e.g., solid or random effect models).

As a simpler approach, a regression model such as the following can be constructed to estimate the effect of the change in production (ΔX) in different economic categories on the change in total output (ΔY) across districts (where 'i' stands for district):

$$\Delta Umumiy_i = \beta_0 + \beta_1 \Delta Fermer_i + \beta_2 \Delta Dehqon_i + \beta_3 \Delta QishloqXo'jalikKorxonalari_i + \varepsilon_i$$

However, due to the small number of observations (16 regions), the statistical significance and ability to generalize the results obtained from such a model will

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be limited. Therefore, the main emphasis in this analysis was focused on the descriptive and comparative analysis of the trends observed. The results show that the overall increase in grain production in the region, despite the decline in peasant farms, was mainly due to positive dynamics in farms and partly in agricultural enterprises.

Conclusion

This study was aimed at the comparative analysis of dynamics of grain production volumes in Samarkand region by economic categories and administrative regions for 2019-2020. The results of the analysis showed that during this short period, the total grain harvest in the province increased significantly (13.1%). This positive change was mainly due to an increase in the productivity of farm activities (17.4% growth) and a slight increase in the share of agricultural enterprises (15.7% growth).

At the same time, the study found a sharp (19.7%) decrease in the share and volume of peasant farms in grain production. This circumstance, coupled with an increase in the share of farms, indicates a structural shift of grain production in the region towards larger, commodity farms. Interregional analysis showed that there are significant differences in the dynamics of grain growing: in some districts (Akdarya, Kattakurgan, Kushrabat) there was a very high growth rate, while in other regions (Samarkand city and district) there was a decrease.

These results are important in the formation of provincial agrarian policy. In particular, it is necessary, along with further support for farms, to study the causes of decline in the activities of peasant farms and to facilitate their transformation, as well as to develop measures aimed at reducing territorial imbalances.

The study's main limitations are the fact that it covers a short time interval (two years) and did not reveal fundamental reasons for the observed changes. In future studies, it is worthwhile to attract additional economic indicators and qualitative analysis methods in order to analyze a longer period, identify the factors of declining peasant farm activity and territorial differences.

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