Basic issues in the development of grain production in the Republic of Armenia in the context of food security

Abraham Ghukasyan
Vardan Aleqsanyan
Alvard Matinyan
Galstyan Merujan
Lusine Matevosyan

Abstract

Ensuring food independence and food safety is one of the most important issues of social and economic development of the Republic of Armenia. This has a key meaning, since in the current conditions of the social-economic and international policy of the Republic of Armenia, the role of supremacy of national interests and economic security of the state has become even more important.

The food security of the country directly depends on the indicators recorded by the agricultural sector, and although the agricultural sector is of strategic importance for the Armenian economy, in 2022, compared to the previous year, the growth was only 0.4%, which is associated with an increase of 5.7% and a decrease by 5% in the horticultural sector.

It is especially alarming that one of the main branches of RA agriculture saw a 38.9% decrease in grain output quantities from 2005 to 2022.

Emphasizing the role and importance of grain production in the context of food security and security of the country, it becomes necessary to assess the internal reserves for increasing grain production, creating sufficient conditions for the full and effective use of arable land, and developing multifaceted state support tools to intensify the industry.

1 Introduction

Agriculture is one of the priority sectors of the Republic of Armenia, which in 2022, according to data, accounts for 10.4% of the country's gross domestic product (880.6 billion AMD). It provides work for more than 22% of the employed (237.4 thousand people). The development of the agricultural sector is due to the development of both rural communities and those sub-sectors that have a significant share in the value chain of food production, which are based on local agricultural products and have a fairly large export potential (Tspnetsyan, H. S., 2005).

The data show that in 2022, the agri-food sector's share of global exports was 23.91% (1281.7 million US dollars), with agricultural products making up 7.55% of that total. The

*Corresponding author:
lusnyak.matevosyan81@mail.ru
RA receives more agri-food product imports overall. In 2022, it amounted to 136.6 million US dollars, or 15.59% of total imports, per the data. 8.98% of them were agricultural products. With regard to certain types of agricultural products of strategic importance, this situation may adversely affect the country's food security, since the level of self-sufficiency in these products is noticeably low. In particular, in 2021, the level of self-sufficiency in wheat was 23.2%, pork meat 53.2%, poultry meat 26.7% (Ghukasyan et al. 2022; https://www.armstat.am/am/?nid=81).

One of the most crucial jobs of the twenty-first century is feeding the populace, which has become more difficult as a result of the unanticipated events that have occurred recently and their effects (Artsakh war, pandemic, Russian-Ukrainian war, sanctions, export restrictions). Based on the current situation, each country must develop and implement a strategy to overcome internal and external threats and meet at least 80% of the total food consumption of the population from its own resources (Diana Galoyan and Tatul Mkrtchyan, 2022).

2 Results and discussion

The role of agriculture is very important in terms of food security and independence of the country, so we observed the dynamics of the production of the main agricultural products of the Republic of Armenia in 2005-2022. (Table 1).

Table 1. Production of main agricultural products in RA, 2005-2022, thousand tons

<table>
<thead>
<tr>
<th>Product Name</th>
<th>2005</th>
<th>2010</th>
<th>2015</th>
<th>2020</th>
<th>2022</th>
<th>2022 vs 2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cereals and legumes</td>
<td>396.2</td>
<td>326.4</td>
<td>637.9</td>
<td>243.0</td>
<td>241.9</td>
<td>61.1</td>
</tr>
<tr>
<td>Potato</td>
<td>564.2</td>
<td>481.9</td>
<td>764.5</td>
<td>427.3</td>
<td>351.4</td>
<td>62.3</td>
</tr>
<tr>
<td>Vegetable crops</td>
<td>663.8</td>
<td>707.7</td>
<td>1031.2</td>
<td>650.7</td>
<td>610.4</td>
<td>92.0</td>
</tr>
<tr>
<td>Fruit and berry</td>
<td>315.2</td>
<td>128.5</td>
<td>386.5</td>
<td>254.9</td>
<td>346.3</td>
<td>109.9</td>
</tr>
<tr>
<td>Grape</td>
<td>164.4</td>
<td>222.9</td>
<td>309.3</td>
<td>264.8</td>
<td>225.8</td>
<td>137.3</td>
</tr>
<tr>
<td>Animal weight gain</td>
<td>99.1</td>
<td>124.3</td>
<td>176.1</td>
<td>189.6</td>
<td>181.9</td>
<td>183.6</td>
</tr>
<tr>
<td>Milk</td>
<td>594.6</td>
<td>600.9</td>
<td>728.6</td>
<td>654.3</td>
<td>623.1</td>
<td>104.8</td>
</tr>
<tr>
<td>Egg, million</td>
<td>519.2</td>
<td>719.2</td>
<td>659.8</td>
<td>754.6</td>
<td>749.1</td>
<td>144.3</td>
</tr>
</tbody>
</table>


The data in the table indicate that the volume of agricultural production up to 2015 has increased significantly. Thus, in 2005, compared to 2015, cereals were produced by 61%, grapes by 88%, vegetables by 55.3%, potatoes by 35.5%, vegetables by 78%, eggs by 27% and milk by 22.5% (Federal State Statistics Service, 2006).

However, studies have shown that since 2017, production volumes have declined sharply. In 2017, compared to 2022, 60.6 tons of grain, 196.0 tons of potatoes, 250.6 tons of vegetables, and 135.1 thousand tons of milk were produced less.
importance and occupied territories, and due to their high nutritional value, grain is of great importance for the population.

<table>
<thead>
<tr>
<th>Table 2. Production, consumption and self-sufficiency in grain in the Republic of Armenia, 2005-2021</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Indicators</strong></td>
</tr>
<tr>
<td>Grain sowing area</td>
</tr>
<tr>
<td>Specific gravity in the field</td>
</tr>
<tr>
<td>Yield g/ha</td>
</tr>
<tr>
<td>The total yield 1000 t.</td>
</tr>
<tr>
<td>per capita kg</td>
</tr>
<tr>
<td>Imports 1000 t.</td>
</tr>
<tr>
<td>Total resources 1000 t.</td>
</tr>
<tr>
<td>Balance at the beginning of the year 1000 t.</td>
</tr>
<tr>
<td>Use according to directions 1000 t.</td>
</tr>
<tr>
<td>- for food 1000 t.</td>
</tr>
<tr>
<td>- for fodder 1000 t.</td>
</tr>
<tr>
<td>- for the seed 1000 t.</td>
</tr>
<tr>
<td>- other use 1000 t.</td>
</tr>
<tr>
<td>Losses 1000 t.</td>
</tr>
<tr>
<td>Balance at the end of the year 1000 t.</td>
</tr>
<tr>
<td>Annual actual consumption per capita kg</td>
</tr>
<tr>
<td>Level of self-sufficiency %</td>
</tr>
</tbody>
</table>

Wheat, barley, rye, beech, oats and corn are considered in the grain group.

Calculations showed that 50.4 kg of grain were produced per capita of the permanent population of the Republic of Armenia in 2021, and 121.7 kg in 2005. In this context, grain imports to the RA were noted (Food Security and Poverty 2005-2020).

Over the period, the volume of grain imports increased from 400.4 thousand tons to 451.9 thousand tons. The share of grain in food imports ranged from 11.0-15.0%.

According to the national food balance in 2005-2021 the level of self-sufficiency in grain fluctuated between 25-62%, demonstrating a downward trend (in 2021-24.9%).

Fig. 1. Dynamics of grain production and domestic consumption in RA, 2002-2021. *Production, 1000 tons – Total offer, 1000 tons.*

The amount of domestic grain consumption compared to domestic production is quite different, there is a significant discrepancy. In 2005, only 807.6 thousand tons were used, and in 2021, 645.5 thousand pieces were used, while the volumes of local production were 391.8 thousand tons and 149.9 thousand tons, respectively, which is a rather low index.

Figure 1 shows that in 2006 grain production dropped sharply in 2005, which was caused by a 13% reduction in acreage and a 31.4% drop in yields. As a result of the implementation of a number of programs introduced by the Ministry of Agriculture of the Republic of Armenia in order to stabilize the industry, since 2011 the grain yield and gross harvest have increased.

However, in 2016, as a result of a sharp reduction in the acreage of grain crops, there is a downward trend in production volumes: in 2021, the gross grain harvest decreased by 74.9% compared to 2016, and compared to 2005–by more than 61.8% (Avetisyan S.S., 2014; https://www.armstat.am/file/article/sv_12_20a_122.pdf).

From the same chart, it becomes clear that the rate of domestic grain consumption is much higher than the rate of production and shows the same fluctuations as the rate of production. As a result of studying the data of the national food balance, it was found that...
the domestic grain market in 2005-2010 was mainly focused on the use of grain for food purposes, the share of food grain in the volume of domestic consumption ranged from 54-76%. This indicator had a minor decline from 2011 to 2016 from 65.9% to 53.74%, but since then it has increased once more, rising to 68.7% in 2021. In the same period, the amount of grain used for fodder has changed in accordance with the pace of development of animal husbandry. The share of the latter in the volume of domestic consumption was 20-27%, and in some years it was 30-33%. One of the problems of grain production is also the loss of the harvest due to the destruction of the sown areas due to various reasons (The social image and poverty of Armenia, 2005-2021; RA socio-economic situation in January-December, 2020; RA Statistical Yearbook, Standard of Living, 2021).

According to the research done by our professional group, unfavorable environmental conditions are the primary reason for seed loss. About 51% of spring grain crops and 7.1% of winter crops were lost as a result of the drought in 2021. Regions of Shirak, Gegharkunik, and Vayots Dzor were most severely impacted. Although the Akhuryan reservoir, the largest in Armenia, is located in the Shirak region, due to the lack of infrastructure, the lands adjacent to the reservoir have remained waterless since Soviet times. Similar problems exist in other regions. This situation could be mitigated if the required volume of irrigation water was supplied on time.

According to an analysis of the food balance of grain articles, there was a considerable increase in grain losses between 2005 and 2021, totaling 49,000 tons. Losses often happen at the pre-harvest, harvest, and post-harvest periods for grains. Pre-harvest losses may be due to the prevalence of pests and weeds. Losses also occur due to grain breakage during harvesting. Moreover, post-harvest losses occur in the period from harvesting to consumption. They also include losses in farms related to grain threshing, wheat cleaning and drying. Losses can also occur as a result of unfavorable climatic conditions, the wrong choice of harvesting dates, harvesting methods, and improper organization of loading and unloading operations. Significant losses also occur due to inadequate storage conditions, as well as poor decisions taken at the initial stages of the supply chain, including transportation, storage and processing, which predispose to a shortened shelf life of the product.

According to our calculations, grain harvests in the Republic of Armenia are increasing from year to year and in 2021 they reached 49 thousand tons, or 32.7% of the total harvest. Grain losses also occur at many stages of production, including 2% during agricultural production, 4% during post-harvest processing and storage, 10.5% during processing and packaging, 2% during delivery, and 23% during consumption.

3 Conclusion

The following are some issues with grain production:

- low level of land use efficiency,
- imperfection of irrigation water management,
- infrastructure imperfection
- lack of innovative development, including the introduction of new production and processing technologies in the face of global climate change.

According to the results of the study, it became clear that the level of land use in the Republic of Armenia in 2021 was 51.2%, and for the main grain regions, this figure was:

- Aragatsotn region: 38.8%,
- Gegharkunik region: 40.5%,
- Kotayk region: 31.4%,
- Shirak region: 55.0%,
- Syunik region: 38.2%,
- Lori region: 39%.

According to rough calculations, if
at least 60% of the vacant lands in these regions (120.0 thousand hectares) are set aside for grain crops, then in conditions of 25 to 30 tons per hectare, an average yield of 300 to 360 tons of grain will be produced, bringing the level of self-sufficiency up to 65 to 69%.

Our surveys of grain producers made it possible to identify the main factors that led to a decrease in grain production:

- drought
- lack of irrigation system,
- lack of high-quality seeds,
- low effectiveness of state support,
- degradation of agricultural equipment on a physical and moral level.

Taking into account the downward trend in grain production in Armenia, as well as the huge food dependence of Armenia on grain from other countries, in particular the Russian Federation, and the inefficiency of the current policy of the Armenian government to regulate the industry, we consider it necessary to actively intervene and revise some provisions of the agrarian policy.

In particular, it is advisable for the state to perform tasks that the market is unable to complete, foster an economic climate that will help communities and individual farms realize their full potential, guarantee population demand for grain crops, safeguard the interests of grain producers and consumers, and build up social and production infrastructure that will eventually result in grain clusters.

One of the top priorities should be to revive the economy of the Ministry of Agriculture while focusing on the Republic of Armenia's food security, the sustainable development of rural communities, increasing the country's competitiveness in the global agricultural market, and also taking into account the percentage of the population employed in agriculture (roughly 31-33% of employees).

The latter, taking into account the resource potential of the republic and the threshold of food independence, should introduce the structure of the state order for grain, which determines the volumes of production and sale of certain types of grain crops. In the future, they will become the basis for concluding agreements with specialized communities and farms.

One of the crucial steps is the establishment of a grain committee (or department) under the Ministry of Agriculture. It is advised to involve experts, scientists, and farmers in this committee's work to strengthen the relationship between the government, science, and economy.

Studies have shown that the economic efficiency of grain production and the quality of grain are largely determined by the level of concentration of production, the degree of specialization and intensification. Therefore, taking into account the specifics of the cultivation of individual grain crops, the production and climatic potential of the regions, the physical and mechanical composition of the soil, the availability of infrastructure, logistics, it is necessary to form grain zones, including large farms, uncultivated lands, as well as unused lands at the disposal of regions.

Concentration of production, expansion of sowing areas due to the increase of land areas, concentration of grain cultivation on one plot of land in the farm will give an opportunity to apply the latest technologies for the purpose of more effective use of high-performance equipment and it will increase the efficiency of production and quality of grain.

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