
# ASSESSMENT OF WHEAT PRODUCTION SUSTAINABILITY BASED ON THE PRINCIPLES OF THE "GREEN ECONOMY"

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**https://doi.org/10.5281/zenodo.17978073**

**ARTICLE INFO**

Received: 15th t December 2025
Accepted: 16th December 2025
Online: 17th December 2025

**KEYWORDS**

*grain industry, food security, sustainability, Syrdarya region, innovative agrotechnologies, efficient use of resources, sustainability index, forecast*

**ABSTRACT**

*The article scientifically substantiates the role and significance of the agricultural sector, particularly the grain industry, in ensuring food security at the global level. Using the example of the Syrdarya region, the study analyzes the current state of wheat production sustainability, the factors influencing its provision, and the prospects for introducing innovative technologies. The scientific novelty of the research lies in the proposal of a differential indexing method for assessing grain production sustainability, which allows evaluating the level of regional provision with gross grain output based on criteria and thresholds classified as "high sustainability," "medium sustainability," "low sustainability," and "unsustainable."*

**Introduction.** At the global level and within individual countries, the role of the agricultural sector in ensuring food security is steadily increasing. In particular, the sustainable development of the grain industry not only ensures the supply of essential agricultural products for daily consumption but also serves as a key factor in creating a feed base vital for livestock production. According to forecasts by the international consulting company Goldman Sachs, by 2050 the world's population is expected to reach 9.8 billion people, requiring at least a 70 percent increase in food production.

At the same time, global climate change, environmental challenges, and political crises are intensifying food security pressures. In developed countries, targeted scientific research is being implemented to mitigate these challenges through sustainable agricultural development, the consistent introduction of innovations and "green" technologies, and the production of environmentally clean organic products.

**1-Table.**

**Criteria and Index Ranges for Assessing Grain Production Sustainability**

| Sustainability Level | Index Range | Description (brief explanation) |
|---|---|---|
| High sustainability | 67.1 – 79.0 | Gross grain output is stable, productivity is high, resource availability is sufficient, and agrotechnical measures are fully implemented |
| Medium sustainability | 55.1 – 67.0 | Production is relatively stable; however, certain resource and infrastructure factors are limited |
| Low sustainability | 43.1 – 55.0 | Instability in grain production is observed, with low productivity and a low level of technology adoption |
| Unsustainable | 31.0 – 43.0 | Production sustainability is not ensured due to resource shortages and weak market infrastructure |

This index comprehensively accounts for gross grain output, yield levels, resource availability, implementation of agrotechnical measures, and the development of market infrastructure. Thus, as a scientific innovation, a methodological approach enabling the differential assessment of grain production sustainability across regions is proposed.

According to econometric modeling results, taking into account factors affecting production sustainability—such as climate indicators, the level of agrotechnology adoption, government support, and the development of market infrastructure—a gradual increase in gross grain output up to 2030 is forecast. Model calculations indicate that:

- ✓ in 2023, total national gross grain output amounted to 8,453.4 thousand tons, while by 2030 it is projected to reach 9,000 thousand tons, representing an increase of 6.5 percent;
- ✓ in the Syrdarya region, under conditions of accelerated adoption of innovative agrotechnologies, it is possible to increase crop yields by 15–18 percent by 2030, while reducing water and fertilizer consumption by 10–12 percent;
- ✓ the grain production sustainability index may improve from the “medium sustainability” category to the “high sustainability” level.

These results scientifically demonstrate the direct impact of current strategic decisions on future food security.

**Conclusion.**The conducted research shows that ensuring the sustainability of grain production in the Syrdarya region and throughout the republic requires a комплекс and multidimensional approach. The proposed method of differential assessment of regional grain provision sustainability serves as an effective tool for managing the grain sector, improving state support mechanisms, and optimizing resource allocation.

Moreover, forecasts up to 2030 confirm that accelerating the adoption of innovative agrotechnologies, digitalizing the grain market, and strengthening state support for the technical modernization of grain producers can significantly enhance grain production

sustainability. The research findings have practical significance for relevant ministries and agencies, grain-producing enterprises, and farms, and can be used in developing programs aimed at ensuring sustainable grain production.

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