WHEAT GRAIN PRODUCTION AMIDST CLIMATE CHANGE AND WARTIME RISKS

Alla BORTA, ORCID: 0000-0001-9790-4732
Olena SOKOLOVSKA, ORCID: 0000-0003-4326-1932
Liudmyla VALEVSKA, ORCID: 0000-0003-0511-5643
Georgii STANKEVYCH, ORCID: 0000-0002-0583-8174

Department of Grain and Feed Technology, Odesa National University of Technology, Odesa, Ukraine

*Corresponding author: Alla Borta, borta.alla@ukr.net

Introduction. The grain sector is of strategic importance to Ukraine's economy: it ensures food security, generates foreign currency earnings from exports, provides income for agricultural producers, and fosters rural development.

Wheat is Ukraine's primary food crop; it ranks first in terms of sown area and makes a decisive contribution to the nation's food supply and export potential.

The aim of this study is to analyze the dynamics of wheat production across various regions of Ukraine amidst climate change and wartime risks, and to visualize these changes. The study also seeks to identify key trends and the factors influencing them.

Materials and Methods. Climate change has significantly impacted the efficiency of agricultural production in Ukraine. Key trends include rising average annual temperatures and uneven precipitation, leading to fluctuations in the yields of major crops. Furthermore, the increasing frequency of droughts, floods, and hailstorms negatively affects both crop quality and volume. The southern steppe regions are particularly vulnerable to climate change, as summer precipitation deficits significantly reduce yields. At the same time, the implementation of adaptation measures-such as using drought-resistant varieties, modernizing irrigation systems, optimizing crop rotations, and applying modern agricultural technologies-helps stabilize production and minimize losses. Current conditions have resulted in a distinct regional differentiation across Ukraine based on yield levels, as well as security and climatic factors.

Another aspect of wheat production in Ukraine in recent times involves war-related risks and economic factors. The Russian Federation's full-scale invasion in 2022 significantly impacted the crop production sector, particularly wheat cultivation. Sowing areas have decreased, while difficulties in accessing fertilizers and fuel have led to lower yields. The blockade of seaports caused a marked decline in export volumes.

Results and Discussion. Analysis indicates that wheat cultivation in Ukraine is taking place under the simultaneous influence of climate change and war-related risks, which are significantly transforming regional production conditions.

Shifting temperature patterns and uneven precipitation are altering the agro-climatic suitability of various regions. The traditionally major grain-producing regions of the South and East are increasingly facing moisture deficits and droughts, whereas relatively more favorable conditions for wheat cultivation are emerging in the central, northern, and parts of the western regions. Hostilities exacerbate the negative impact of natural and climatic factors by reducing sown areas, damaging production and logistics infrastructure, and complicating grain storage and exports.

Conclusions. Thus, adapting grain production to climate change and wartime risks is a necessary condition for preserving Ukraine's production potential, food security, and position in the global grain market.

Keywords: *wheat, grain production, climate change, war risks, yield, sown areas.*