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THE INFLUENCE OF CLIMATE CHANGE ON AGRICULTURE OF THE UKRAINE

Nowadays climate change and global warming is no longer fairy-tale in the natural science textbook, but an objective reality. Countries and societies all over the world have realized an urgent need to counteract climate change and/or to

implement adaptation measures to climate change. As governments continue to discuss the implementation of the Paris Climate Agreement amid efforts to keep global temperatures from rising further, the signs of climate change in Ukraine are already becoming increasingly obvious.

What main changes in climatic conditions are observed right now in Ukraine? First, changes in spring temperature regimes that cause the sowing time to shift are observed. In the last 3-4 years, spring sowing begins an average of 14 days earlier. There is an increase in temperature extremes and anomalous phenomena: low temperatures or abnormal heat, large differences between daytime and night time temperatures, snowless winters, and prolonged heat in summer. Strong winds cause wind erosion of the soil and often interfere with crop protection.

During the last half of the twentieth century, annual rainfall in Ukraine has remained almost unchanged, but global warming has led to a decrease in rainfall efficiency. Climate change has, for example, caused a reduction in the area of sufficient soil moisture and an increase in droughts in the Ukrainian territories.

And in order to minimize the risks of climate change for agriculture, it is necessary to adapt to new conditions. It is the success of such adaptation that will determine the economic feasibility and efficiency of the crop sector in Ukraine over the next 10-15 years.

Adapting to changing conditions, the following main measures are taken:

Shift the time of sowing and, accordingly, other stages of cultivation depending on climatic conditions. Some farms, using the earlier completion of the harvest, perform part of the operations (weed control, fertilizing, etc.) before the autumn sowing of winter. The share of farms introducing sidereal crops into crop rotation has increased.

To maintain moisture in the soil, farmers learn to use the properties of soil ecosystems, which are formed by reducing the depth and intensity of soil cultivation, as well as the presence of plant residues from previous seasons. Yes, mini-till technologies are used, and no-till technology is justified in the southern regions where no soil compaction occurs in the north. The same technologies help to reduce soil erosion and restore its fertility.

Use seeds resistant to drought and high temperature varieties or hybrids. When choosing seeds, farmers must pay attention to its resistance to climatic factors.

Due to adverse weather conditions (strong winds, high daytime temperatures), farms postpone plant protection work at night.

The destabilization of the phytosanitary state of agrocenoses, which began in the 90s of the twentieth century, continues today under the conditions of stabilization of plant protection measures, which testifies to the dominant influence

of climate change on the phytosanitary state. Majority of Ukrainian scientists are certain that a significant threat to the overall diversity of the entomofauna, which plays a leading role in ensuring the environmental sustainability of agro-landscapes, can be expected in the future. Reduction of ecological stability of agro-ecosystems, first of all, will be manifested by deterioration of the phytosanitary status. The latter can occur through a variety of mechanisms through: changes in the insect damage zones of phytophagous, restructuring of the species structure of dominant entomocomplexes, increasing the generation of individual insect species and the number of dominant insect pests, increasing the likelihood of mass-related emergencies in the agrosphere. Extending the growing season under warming conditions can lead to an imbalance of phenological coadaptations in the system of crop plant - insect phytophages, which will affect plant resistance and insect damage. In fact, we can now observe that climate change is causing the spread of various pathogens in Ukraine: pests (Western corn beetle, American white butterfly, etc.), weeds (Syrian paddy, ragweed), weed parasites (sunflower top) and so on. Accordingly, each case requires up-to-date specific measures.

Nowadays nearly 5% of grains and 10% of potatoes, vegetables and forage crops in Ukraine are irrigated. As summer temperatures rise and rainfall decreases, the need for irrigation may increase. With decreases in frost days predicted, winter wheat crops, which are particularly susceptible to frost damage, are more likely to survive in to spring. Some scientists are assured that climate change, coupled with the benefits from new crop varieties and better technology, could increase crop yields in our country. Conditions may become more favourable for barley, oat, corn, legumes and other crops, as well as green fodder. Recently, the Food and Agriculture Organization of the United Nations have published another forecast for Ukraine - according to its data, our country can soon lose up to 70% of the crop due to increasingly frequent droughts connected with climate change.

Ukraine is a country with high agricultural potential. Universally accepted, that climate-driven changes can compromise food security and economic growth; such changes are most probable for Ukraine as well. However, to develop and implement counteraction and adaptation to climate change measures, state policy, international projects, public and private investments in research and development are urgently required.