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CHANGING FOOD SUPPLY THROUGH NEW IRRIGATION APPROACHES

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ABSTRACT

This work is devoted to the analysis of information on the state of water supply, new trends in agricultural development, as well as the forecast of food supply in various regions of the world. Information on measures for the correct use of mineral fertilizers in the production of agricultural products is considered.

Keywords: population growth, water supply, irrigation systems, environmental situation, soil layer, soil fertility.

INTRODUCTION

The state of the climate and its prospects for change are always on the main line before human society. Today, this indicator plays a major role in assessing the living conditions of the population and the level of economic development of countries. This was discussed a lot and in detail at the COP 28 UAE conference in Dubai (the Presidents of Uzbekistan and the Republic of Belarus drew attention to this problem) [1].

The population of our planet is constantly increasing and this entails a sharp increase in the struggle for countries to have grain reserves, and the situation is especially difficult in African countries, but other countries are also striving to improve their position in the provision of these reserves. Another reason is the deterioration of the environmental situation and its negative impact on grain production in agriculture [2]. Argentina took first place in the list of grain suppliers to Brazil (2 million tons of grain worth $736.3 million), and Paraguay took second (886 thousand tons of grain worth $290 million). The third place was taken by Uruguay (544 thousand tons worth 211 million dollars), fourth by Russia, and fifth by the USA (80 thousand tons worth 20.85 million dollars) [3].

The development of agriculture depends on many factors, the amount of precipitation, the period of precipitation, temperature, and the condition of the soil layer. They give good results only with the correct use of irrigation resources, i.e. It is now necessary to use water-saving technologies. The reason is a sharp decrease in water reserves, an increase in the negative impact on the soil layer.

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Fig.1. The influence of drought on the development of wheat.

Problems with agriculture in the United States and China have been predicted for a long time. According to scientists, in these countries (USA and China) there was simply incredible luck. The climate has always had a certain element of unpredictability. Climatologists believe that at the moment we are experiencing a La Nina period on our planet (due to the influence of the world's oceans, the air temperature is cooling or decreasing), but this year a change in the period to El Nino is expected (this means an increase in temperature or just heating). This could mean that temperatures across the Earth will increase, leading to more droughts. In other words, we will observe in the agricultural sector an uneven distribution of water resources necessary for agriculture. It is advisable to widely apply water-saving technologies, taking into account the relief, climate and type of soil layer, i.e. air, drip systems or their combined use (especially during the hot period of the year in the countries of Central Asia).
Scientists remind that already in 2021-2022, Africa experienced an incredible rainfall deficit, reaching 80%, which greatly affects the agriculture of countries in this continent. As a result , livestock deaths are observed in the countries of Southern and Central Africa (Ethiopia, Kenya and Somalia), which caused an even greater deterioration in the level of poverty of people [5] . This can be considered the result of improper use of water resources, as well as deterioration of the environmental situation.

Fig.2. Impact of drought in Africa on cereal development

It has already become impossible to deny the fact that the climate on Earth is rapidly changing. As a result, we are seeing an increase in extreme weather events and changes in seasonal patterns. Scientists say heat waves and drought will be detrimental to grain harvests and ultimately impact food supplies around the world.

Currently, drought is observed throughout the Earth, and not just in certain regions. Therefore, more than half of the largest Lakes and reservoirs are at risk of drying up completely in the near future . Some countries may experience severe drought this summer . Both of these factors, that is, high temperature and drought, may leave no opportunity to grow grain in the United States and China.

Climate change affects the following factors:

- state of the river drainage region,
- changes in precipitation patterns by region of the world,
- a sharp quantitative change (increase or decrease) in precipitation according to the seasons.

On the other hand, the desire to achieve a stable food supply leads to an increase in the consumption of mineral fertilizers. During the period from July 2022 to June 2023, imports of Russian fertilizers to Germany increased by 334% - to 167 thousand tons.

The use of mineral fertilizers is one of the effective methods of intensive farming, which can significantly increase productivity. To solve several problems at once, for example, to improve germination and increase resistance to external influences, farmers use complex fertilizers. One of these is sulfoammophos .

All these elements - nitrogen, phosphorus, sulfur, calcium and magnesium - are initially contained in the soil. However, over time, the fertile layer is depleted, and mineral fertilizers replenish the supply of nutrients.

Most of the sulfoammophos is used during the main application of fertilizers - before sowing in spring or autumn. In addition, fertilizer is used as a top dressing during the growing season 1–2 times per season, but in much smaller quantities: grains - 30–90 kg/ha; oilseeds - 20–30kg/g; corn - 30–120 kg/ha; technical - 30–150kg/ha; vegetable - 30–75 kg/ha [8].

It is stated that Russia's share in total imports increased from 5.6 to almost 18% in just one year. In particular, according to Destatis , imports of urea, which has the highest nitrogen content at 46%, increased by 304% in the first half of 2023. In Berliner Zeitung noted that the increase in fertilizer imports from Russia is occurring throughout the EU. Its share in the export of nitrogen fertilizers to the EU has increased fivefold, to a share of 19%. At the same time, prices for fertilizer producers (Germany) in August 2022 almost doubled compared to the same month a year earlier. In the domestic market in the second quarter of 2022, sales of phosphate fertilizers decreased by 51%, potash fertilizers by 52%" [7].

Sulfoammophos is a universal fertilizer that can be used for most plants. It's great for sunflowers and other oilseeds: it increases the oil content. The use of sulfoammophos on winter wheat gives an increase in grain yield by 20 c/ha.

Obtaining a good harvest of agricultural products is possible under the following conditions:

- accounting and correct consumption of irrigation sources,
- reducing the negative impact of chemical fertilizers on the soil layer,
- increasing the fertility of agricultural areas through the correct use of information obtained from local sources,

- improving the culture of land use among users through proper irrigation.

The above conditions, if fulfilled, will make it possible to raise the economic status, as well as to carry out irrigation over large areas with small volumes of water resources, i.e. receive economic profit by improving the ecological state of the environment.

In conclusion, it should be noted that the level of environmental influence on grain yields can be reduced by creating new drought-resistant wheat varieties and using water-saving technologies.

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