



Application of Resource-Efficient Irrigation Technology to Winter Wheat

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Abstract: The article discusses the importance of using resource-efficient irrigation technologies to reduce the impact of water scarcity on agricultural crops as a result of global climate change. At the same time, it has been written about the importance, relevance and advantages of applying moisture-retaining hydrogel crystal to winter wheat as a resource-efficient irrigation technology.

Keywords: water resources, hydrogel, climate, crystal, moisture, crop, irrigation, wheat, agrotechnology, technology.

Currently, 2.1 billion tons of grain are grown worldwide, of which wheat grain makes up 759.6 million tons of the total harvest. The wheat cultivation area is 243.5 million hectares, including countries such as the USA, Germany, China, India, Brazil, Australia, Canada, Russia, and Ukraine. The average grain yield in harvested conditions is 3.1 tons per hectare, and in dry land conditions is 1.5 tons. Scientists say that by 2050, grain production in the world is expected to reach 3 billion tons.

The application of modern agro-technologies in the cultivation of winter wheat varieties, the effective use of irrigated land along with the increase in grain yield, and the improvement of the technological quality indicators of grain are gaining great importance today. In irrigated conditions, each province has its own soil and climate conditions, depending on its geographical location and regions.

The Bukhara oasis differs from other regions of Uzbekistan due to its soil and climate conditions. Cultivation of promising varieties of winter wheat in the conditions of saline and salinity-prone soils of the Bukhara region, cultivation of winter wheat varieties taking into account their biological characteristics, preparation of land and seeds for planting, planting method, rate, terms, feeding with organic and mineral fertilizers, watering procedures, rates and periods, implementation and further improvement of effective methods of combating weeds, diseases and pests, and at the same time applying resource-efficient irrigation technologies. Therefore, scientific research on the economy of water resources is considered urgent. In the world, various irrigation methods are used to meet the water demand of agricultural crops and to obtain a high yield. Due to global climate change, there is a shortage of water resources, especially in 2022.

According to scientists, global climate change will not fail to affect the Republic of Uzbekistan, that is, there are many predictions about water shortages in the Republic in the future, for example: in particular, at the beginning of the 90s of the last century, the total volume of water consumption in Uzbekistan was around 64 billion cubic meters, and the population of the Republic was 21 million people. Today, the annual water demand in Uzbekistan is about 52 billion cubic meters, and the population is more than 34 million. According to experts, by 2030, annual water resources will decrease from 52 billion to 44 billion as a result of global climate warming, and the population will increase by 39 million.

Based on the above information, it can be said that the demand for water resources will increase in the next 10 years. In order to prevent water shortage in agriculture, large-scale works are being carried out in our Republic on the application of water-saving technologies in irrigated areas.

A number of advantages of using moisture-retaining hydrogel crystals as a water-saving technology are emphasized by world scientists. The main feature of the moisture-retaining hydrogel crystal is the ability to absorb a large amount of water and increase its volume. When saturated with moisture, the hydrogel is like jelly. It absorbs not only water, but also nutrients - fertilizers. As the soil moisture decreases, the waterlogged soil gradually gives all the moisture to the plants. When using hydrogel granules, the frequency of watering any crops is reduced. Jelly-like substrate is completely harmless to plants. It has a neutral reaction, does not contain bacteria or fungi, because it is not an organic material. And most importantly, it can be dried and saturated with moisture many times: moist soil retains its properties for a long time, does not decompose. Moisture-retaining hydrogel crystal absorbs and retains moisture well, gradually giving it to plants. That is, if a moisture-retaining hydrogel crystal is added to the soil, the moisture capacity of the substrate increases. Moisture-retaining hydrogel crystal absorbs 200-300 times its own weight in rainwater or irrigation water, and 200-250 times more water in soils, depending on the amount of different salts in the soil. Water that has passed to the soil through atmospheric precipitation or irrigation is stored in a state where it can easily pass to the roots of plants.

The advantages of using moisture-retaining hydrogel crystal are as follows: it saves irrigation water, reduces its consumption due to the retention of mineral fertilizers in the fertile layer of the soil, further enriches the fertile layer and increases productivity, protects lands and groundwater from salinity, agriculture increases the productivity of agricultural crops.

The use of moisture-retaining hydrogel crystal has a fast and strong effect on almost all types of plants, ensuring germination and increasing the productivity of plants. Farmers and gardeners who use moisture-retaining hydrogel crystal for watering crops will achieve a very positive result. Moisture-retaining hydrogel crystal contains mineral and biological fertilizers, trace elements and biological microorganisms that protect plants from various diseases. If the moisture-retaining hydrogel crystal is used in agriculture, it will first of all save water resources, and at the same time, it will have an effect on increasing productivity.

In conclusion, it can be said that today we are conducting a series of experiments on the application of moisture-retaining hydrogel to winter wheat in the conditions of the Bukhara region. A number of achievements were made during these experiments. In particular, water resources were saved in the options where the moisture-retaining hydrogel crystal was used, the yield of winter wheat was increased, besides, it should be noted that the condition of soil reclamation improved due to the fact that it retains moisture in the soil. Today, there are many resource-saving technologies, we should learn and improve these technologies, if necessary, create new technologies. To date, in order to use these technologies correctly, we need to conduct a lot of research.

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