DETERMINATION OF EFFICIENCY OF GROUNDWATER USE IN IRRIGATION OF MILLET PLANTING

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Annotation.
According to the article, heavy sandy soils of Bukhara region were irrigated 3 times from groundwater in the experimental field planted with millet in conditions of groundwater level 2.0–3.0 m, seasonal irrigation norms - 2850–2980 m3 / ha. Irrigation was determined when the marginal field moisture capacity (ChDNS) in terms of soil moisture was 70-70-65%. The results of experiments conducted to study the effect of irrigation using groundwater on the growth, development and yield of millet are presented.

Keywords:
millet planting; water shortage; irrigation norms; seasonal irrigation rate; groundwater; mineralization; vegetation period.

Rational use of water resources is one of the most important issues in the development of the world economy. In particular, during the years of water scarcity, special attention is paid to increasing the water supply of irrigated lands. In this regard, groundwater is widely used for irrigation in arid and semi-arid countries. About 1/3 of all land is irrigated by groundwater, including the total irrigated area in the United States

46%, in Iran 59%, and in Libya completely irrigated with groundwater used. In Russia, only 0.43 km3 / year is used for irrigation and pasture irrigation, which is only 4% of the total groundwater abstraction. In this regard, special attention is paid to research work on the protection of water resources around the world[1].

At the conferences on water problems in the world, it is important to improve the methods of increasing the water supply of irrigated lands, the implementation of comprehensive measures for the protection of water bodies, as well as the rational use of land and water resources. Maintaining productivity in this regard It is important to develop new approaches to increase water supply in times of water scarcity. One of the important tasks in the study is the development of groundwater irrigation technology to increase water supply in the years of water shortage in Vobkent district of Bukhara region.

At present, measures are being taken in the country to rationally use water resources and increase the water supply of irrigated lands. In the Action Strategy of the Republic of Uzbekistan for 2017-2021 "Further improvement of the reclamation of irrigated lands, development of reclamation and irrigation networks, the introduction of intensive methods of agricultural production, primarily modern water and resource-saving agro-technologies, the use of high-efficiency agricultural machinery"[1]function is defined. In this regard, increasing groundwater use is one of the important tasks.

In order to eliminate these problems, the President of the Republic of Uzbekistan PF-3932 of October 29, 2007 "On measures to radically improve the system of land reclamation", PF-5330 of February 12, 2018 "On organizational measures to radically improve the system of public administration of agriculture and water management", 2017 PQ-2954 of May 4, 2017 "On measures to regulate the rational use and accounting of groundwater resources in 2017-2021", PF-5418 of April 17, 2018 "Radical improvement of the system of public administration of agriculture and water resources" The tasks set by the Presidential decrees "On measures to improve the living standards of the population" are being implemented in practice[2].

In Uzbekistan, millet is grown as a primary and secondary crop. Cultivation of millet as a secondary crop allows to grow grain twice a year. In particular, the low planting rate, rapid ripening, the presence of short-day plants further increase its value. In the dry, hot weather of Uzbekistan, replanted millet gives high yields. It is the most resistant to drought and heat among replanted cereals[5].

One of the urgent problems in grain growing in the country is the creation of drought-resistant, fast-ripening varieties of millet, capable of yielding two crops a year and improving the technology of their cultivation as a secondary crop on irrigated lands.[12].

The purpose of the study. It consists of determining the laws of formation of the quantity and quality of groundwater in Bukhara region during the years of water shortage and the development of comprehensive measures for its use in the national economy.

Figure 1. View of the experimental field

The objectives of the study are as follows:

- generalization of long-term changes in water balance, determination of water efficiency in the current conditions on the basis of research;
- establishment of the existing water-salt balance over the areas of groundwater located at different depths;
- assessment of the possibility of transferring vegetative irrigation to full supply of withdrawal water and conducting field experiments on the technology of their use;
- development of reclamation measures to prevent negative consequences of the use of drainage water in irrigation;
- determination of water consumption for filtration along the length of the field and their distribution[7,10].

Field experimentsDITDP 2.1.11.2 “Use of collector ditches and groundwater for irrigation in the areas of their formation in order to increase the water supply of irrigated lands (2013-2015)” projects[3] based on the program Grassland with a groundwater level of 2.0–3.0 m and a mineralization of 1.0–3.0 g / l in the Vobkent district of Bukhara region as a secondary crop in the conditions of alluvial, mechanically

heavy sandy soils. The impact of scientifically based irrigation regimens for irrigation on its growth, development and productivity has been studied [4,6].

The total irrigation rate for repeat crop - millet for the experimental plot was calculated according to the formula SN Ryjov:

$$m = (Wnv - Wf) \cdot 100 \cdot g \cdot h + k, \text{ m3 / ha}$$

where: Wnv is the minimum moisture capacity of the soil,% by mass;
Wf is the actual moisture of the soil before irrigation,% of mass
γ - bulk density of soil, g / cm3;
h is the calculated layer depth, m;
k is the water consumption of evaporation during irrigation, relative to the moisture deficit in the calculated layer (10%)[3,8,9].

Irrigation and general irrigation norms given from the vertical ditch well and irrigated with ditch water are given in Table1.

Table 1

Irrigation and general irrigation norms in the experimental and control field

Options	ChDNS			General irrigation standards
	70%	70%	65%	
Stream water	900	1000	950	2850
Retractable water	950	1050	980	2980

In the experimental field planted with millet, at the beginning of the vegetation, the bulk density of the soil was 1.33–1.35 g / cm3 in the 0–30 cm layer, 1.41–1.43 g / cm3 in the 30–50 cm layer below the plowed layer, and 0–100. cm layer was 1.39–1.40 g / cm3. Towards the end of the growing season, in the irrigated version, the bulk density of the soil is 1.34–1.35 g / cm3 in the 0–30 cm layer, 1.42–1.43 g / cm3 in the 30–50 cm layer, and 0 - 1.40–1.41 g / cm3 in the 100 cm layer. An increase in the bulk density of the soil by 0.01 g / cm3 was found to be the lowest compared to other options [11].

Based on the study of the order of irrigation of watermelon crops in heavy sandy soils by groundwater according to the ancient mechanical composition of Bukhara region, the following conclusions were drawn:

Replanting crops are common in the southern regions, where air temperatures are high, through which it is possible not only to strengthen the fodder base, but also to further accelerate grain production;

It was based on the introduction of water-saving methods and technologies to overcome water shortages and the use of technology for irrigation from vertical ditches. In Bukhara region, 967 vertical ditches are operated, the mineralization of extracted water does not exceed 1.5 g / l in 40%, and the rest is 2.0-2.5 g / l, which allows them to be irrigated both naturally and by mixing. allows you to use;

According to the mechanical composition of the farm "Muhammad Ahad" in Vobkent district, field experiments on the transfer of irrigation of agricultural crops at the expense of completely withdrawn water in heavy sandy soils showed that 30 hectares of land can be irrigated simultaneously with water from one well. The technological implementation of this method is very simple, as water from the well is supplied directly to the irrigated fields through internal irrigation networks, thus allowing this technology to be used on other farms as well;

In the use of strongly mineralized waters, it is necessary to calculate additional irrigation norms to eliminate soil salinization, soil fertility and crop yields, especially in the autumn-winter period. Estimates based on the improvement of the water balance model show that increasing the irrigation rate by 1.15-1.25 times compared to the use of fresh water from groundwater with a mineralization of 1.5-2.5 g / l will stabilize the reclamation situation. .

Millet is a highly promising crop that can yield 20-40 tons of green mass per hectare and can easily replace annual grasses;

The optimal sowing period of millet is much longer than that of other crops, but too early as well as late sowing leads to a decrease in field germination of seeds. Therefore, when planted as a secondary crop, it is necessary to determine the period during which it is possible to obtain an optimal high yield.

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