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THE EFFECTIVENESS OF PHYTOMELIORATIVE MEASURES IN CONDITIONS OF SALINE SOILS

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Abstract
The article presents the results of scientific research work carried out to optimize the water and salt procedures of the soil with the help of phytomeliatory measures in the conditions of medium-loamy, moderately saline soils, according to the alluvial, mechanical composition of the meadow of the Bukhara region, to economy the river waters, which are spent on watering agricultural crops and washing

Keywords. Climate change, irrigation farming, water resources, water scarcity, melioration, salinity, phytomelioration, underground waters, irrigation norm, salt washing norm, chlorine-ion, efficiency.

Introduction

The problem of global climate change is relevant on the agenda of mankind, it means not only an average annual temperature increase on our planet, but also a change in the entire geosystem, the occurrence of an increase in the level of the World Ocean, the melting of ice and permafrost, an increase in the unevenness of precipitation, a change in the regime of river runoff and other changes associated with climate instability.

Due to global warming, melting of glaciers in mountainous areas, and a decrease in their volume, the flow of rivers in the next 20 years, in particular, water flowing into the Amu Darya and partially into the Syr Darya and Zarafshan, may decrease by 25-30 %, cause serious problems for the region, as well as the average annual amount of water mineralization in the lower part.

Over the past 50 years, observations of the temperature dynamics regime in Uzbekistan have shown that the maximum rate of temperature growth was 0.22 degrees per year, and the minimum was - 0.36 degrees. Based on this, in 20 years the average annual temperature in the northern part of the Republic increases by 2-3 degrees, and in the southern part - by 1 degree. Climate change leads to an increase in water evaporation from the water surface by 10-15%, an increase in water consumption by 10-20 % due to an increase in plant transpiration and irrigation rates, as well as an increase in water consumption

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without recovery by 18 % in the middle. This undoubtedly hinders the further growth of agricultural production.

The degree of knowledge of the problem. On the study of procedures and methods of irrigation of agricultural crops in irrigation agriculture, reclamation of saline soils, timing, norms and technology of salt washing, the influence of biological drainage and phytomeliorative measures on the water-physical properties of the soil, the order of nutrients, plant growth, development, yield and its quality, as well as the effectiveness of phytomeliorative measures, S Ridzhov, V Eremenko, M Mednis, A Nerozin, R Akhmedov, A Rachinsky, N Bespalov, K Mirzadzhonov, F Rakhimbayev, R Ikramov, M Khamidov, A Avliyakulov, B Mambetnazarov, A Ramazonov, F Baraev, R Murodov, U Norkulov, A Isashev, A Shamsiev and abroad Extensive scientific research has been carried out by such famous scientists as H. Beltrao, Hagedorn, Mohan Reddy Junna, Dagmar Balla, Andreas Thie, Dimitrios Zikos, Katharina Helming, Oudane, David Molden, Liu H., Al-Nadi.

The aim of the study is to optimize the water-salt regime of the soil in the conditions of medium-loamy, moderately saline soils of the Bukhara region with acidic waters of 1.5-2.5 m, mineralization of 3.0-5.0 g/l Meadow-alluvial, mechanical composition with the help of phytomeliorative measures to save river waters spent on watering the main crops and washing

The object of the study is an alluvial meadow of the Bukhara region with moderately saline, acidic waters with a level of 1.5-2.5 m, a mineralization of 3.0-5.0 g/l, medium loamy soils in mechanical composition, as a phytomeliorant plant after winter wheat - "Tashkent oq doni" of white corns (Sorghum Moench pers) and the mung bean variety "Navruz" (Phaselus aureus Piper), their irrigation procedures the field on which the crops were grown is the salt regime of the soil.

The results of the study show that the order of irrigation of phytomeliorant crops after autumn is determined mainly based on the type of crop and its biological nature, depending on the conditions of soil warming. Experiments have shown that when watering white sorghum and moss crops grown as phytomeliorants, the actual demand of agricultural crops for water was taken into account. When watering phytomeliorant crops, watering at soil moisture of 70-70-65 % was carried out according to the 0-1-1 system.

The amount of water spent on irrigation was measured using a Chipoletti VCH-75 water meter. In accordance with the set value of soil moisture, taking into account the water-physical properties of the soil and the depth of moisture when determining the irrigated soil S Ryzhova (1948) was calculated using the following formula:

$$m = 100 \cdot h \cdot J \cdot (W_{LSMC} - W_{AH}) + \mathrm{K}, \; cbm / ha$$

In this: W_{LSMC} is the limited moisture capacity of the field compared with the mass of soil, %;

W_{AH} is the actual humidity before irrigation compared with the mass of soil, %;

J is volumetric weight of the soil, g/cbcm; h – calculation layer thickness, m;

k is water consumption spent on evaporation when watering, cbm/ha (10% of the moisture that is missing in the bearing layer).

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In the research, irrigation of phytomeliorant crops was carried out on the basis of the system established in the accepted work program for the dissertation work. When carrying out irrigation works, the terms and norms of irrigation according to the options were determined based on the amount of moisture contained in the soil. Depending on the growth phases of white corns (sorghum), watering was carried out in the fasting, milk and wax maturation phases, up to starvation. The watering rate of white corns (sorghum) was determined by the soil moisture in the phase before fasting by 50 cm, in the fasting phase by 70 cm, in the phase of milk-wax maturation by a layer of 50 cm. Irrigation rates were 830 and 1024 cbm/ha at the expense of each hectare. The mung bean crop, on the other hand, was watered during flowering and ripening periods during the season with an average watering rate of 860-960 cbm/ha. In the experiments, the phytomeliorant crops were watered 1 time before planting in an amount of 1100-1150 cbm / ha in order to moisten the soil and plow high-quality. Irrigation works for phytomeliorants were carried out from August to the end of September, the period between watering was 22-28 days.

The result obtained in any scientific research and research is estimated by the yield obtained from these plants. In order to determine the yield of grain and straw of phytomeliorant plants after winter wheat in 2009-2011 years, according to the guidelines for determining the yield of white sorghum (sorghum) and mung bean plants, the plant was mowed and crushed separately from fields of 1x1 meter in size by the envelope method from 5 places of each variant and cane, grain and hay During the experiments the highest yield phytomeliorant plants were obtained from white corns, which were planted in winter wheat angina. In this variant, the average grain yield was 4.74 t/ha, and the hay yield was 22.62 t/ha, with an average grain yield of 2.74 t/ha and a hay yield of 1.51 t/ha three years after re-sowing mung bean as a phytomeliorant crop. During the experiments, the highest yield was achieved in 2010 y. This year, the air temperature was very favorable for repeated sowing, which allowed the plant to grow and develop, as well as exhaust the harvest.

Table 1 Grain and straw yield of phytomeliorant plants

№	Options	Grain yield			Straw harvest			Average yield, t / ha		
		Returns			Returns					
		I	II	III	I	II	III	Grain	Straw	Average yield
					2009					
1	Fallow	-	-	-	-	-	-	-	-	-
2	White corn	47,2	47,5	46,8	216,6	214,3	217,4	47,2	216	2.632
3	Mung bean	28,7	26,3	27,2	16,3	15,4	14,6	27,4	15,4	4.28
					2010					
1	Fallow	-	-	-	-	-	-	-	-	-
2	White corn	4.97	4.83	4.92	2.362	2.312	2.347	4.91	2.34	2.831
3	Mung bean	2.74	2.68	2.76	1.42	1.38	1.52	2.73	1.44	4.17
					2011					
1	Fallow	-	-	-	-	-	-	-	-	-
2	White corn	4.64	4.58	4.56	2.244	2.31	2.305	4.59	2.286	2.745
3	Mung bean	2.87	2.63	2.72	1.63	1.54	1.46	2.74	1.54	4.28
					2009-2011					
1	Fallow	-	-	-	-	-	-	-	-	-
2	White corn	4.78	4.72	4.72	2.257	2.255	2.275	4.74	2.262	2.736
3	Mung bean	2.83	2.65	2.73	1.56	1.49	1.48	2.74	1.51	4.24

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Our experiments are aimed at providing additional crop yields while improving land reclamation as a result of growing phytomeliorants. As a result of long-term observations, a high-quality grain yield of 0.45-0.49 t/ha was obtained when growing white corns as a phytomeliorant, while a hay yield of 2.20-2.30 t/ha was achieved. If we observe the yield obtained for the year, then the grain yield of 0.60 t/ha and the hay yield of 0.65-0.69 t/ha were calculated from the autumn grain crops from the field, adding more than 1.0 t/ha of high-quality grain and straw yield with repeated white sorghum, and 3.0 t/ha of hay was obtained. Also, grain yields of 0.26-0.27 t/ha and hay yields of 0.15-0.20 t/ha were obtained from the mung bean culture. This, in turn, increases the economic income of farms, while, on the other hand, improves land reclamation and saves water resources that are spent on salt washing.

Norms of salt washing of the experimental field in the autumn-winter months after growing phytomeliorant plants in the field of winter wheat, salt washing was carried out, fallow the field qualitatively. When setting the salt washing standards, soil samples were taken from the arable field and the amount of salts in the layer in which the brine was washed was determined. Depending on the mechanical composition of the soil and the amount of salts in the soil, norms and deadlines for salt washing were established. When calculating the solution for brine washing In for a one-meter soil layer, taking into account the water-physical nature of the soil and the amount of salts. Theoretical norms of salt washing were calculated according to the V.R.Volobuev formula:

$$N = 10000 * lg\,[\,S_i/S_{adm}\,]^{\alpha},\ cbm/ha$$

In this formula, the coefficient α- is the yield of free salts, S_i , S_{adm} is the amount of salts in the soil before salt leaching and is allowed, in proportion to the mass, in %.

Data on salt washing operations carried out in the experimental field, the highest rate of salt washing was observed in the field where the crop was not sown, when fallow after autumn wheat. We see that the minimum salt washing rate is observed in the variant in which white corns (sorghum) They are planted as phytomeliorants.

Conclusions

1. The cultivation of white corns from phytomeliorant plants, as well as mung bean as a re-crop in fields freed from winter wheat, in conditions of water scarcity, improves land reclamation and increases land use efficiency. After autumn wheat, white sorghum plants were fed to N_{150}, P_{100}, K_{60} kg/ha in moderate quantities and watered, soil moisture was maintained at 70-70-65 % compared to LFMC, with a seasonal watering rate of 1808 cbm/ha watering for grain and 0.2262 t/ha hay yield of 0.0474 kg/ha, and fertilizing mung bean N_{150}, P_{100}, K_{60} kg/ha at a content of 70-70-65%, watering at the rate of seasonal irrigation at 1840 cbm/ha provides a grain yield of 0.274 t/ha and a hay harvest of 0.15 t/ha.
2. In the experimental field, the highest rate of salt washing was on the plowed control variant - 5383 cbm/ha. In option 2, where white corns were planted as phytomeliorants, the seasonal salt washing rate was 2380 cbm/ha, while in option 3,where moss was planted, the salt washing rate was 3403 cbm/ha spending 37-56 % or 1980-3003 cbm/ha less water compared to the control an option.

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