The Influence of the Regime of Irrigation of Fodder Crops and Mineral Fertilization on Crop Yields in Karakalpakstan

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Abstract. During the research, optimal feeding and irrigation regimes for the forage crops "Nayman" and "Shaftoli" varieties of millet were determined, for example, when the soil moisture before irrigation is 65-70-60% compared to the CHDNS; 70-75-65% and the calculated soil layer during irrigation is 30-50-50 cm, high-quality grain yields of white rye and millet are achieved. The results are developed and recommended as a specific guide for farms. The total area of irrigated land in the Chimboy district of the Republic of Karakalpakstan by salinity level is 46910.0 hectares, of which 41576.8 hectares (88.6%) are saline to varying degrees. Non-saline soils account for 5333.2 hectares of irrigated land in Chimboy district, or 11.4%. Slightly saline soils account for 15365.3 hectares of irrigated land in Chimboy district, or 32.8%. The salinity type is chloride-sulfate and sulfate. Moderately saline soils account for 13390.4 hectares of irrigated land in Chimboy district, or 28.5%. The salinity type is chloride-sulfate and sulfate. Strongly saline soils account for 3871.5 hectares of irrigated land, or 8.4%. The salinity type is chloride-sulfate and sulfate. The area of highly saline soils is 8,949.6 ha, or 19.1%.

Keywords: fodder, Naiman, Peach, ChDNS, irrigation, mineral fertilizers, feeding

1 Introduction

In recent years, a lot of exemplary work has been carried out in the republic in the field of reclamation of saline lands. The technology of reclamation of saline lands and cultivation of field crops in them is being systematically studied and is reaching the level of state importance [5]. The care of each field crop based on specific soil and climatic conditions is a guarantee of high and high-quality yields. In the conditions of water scarcity in the world, it is of particular importance to conduct scientific research aimed at rational use of land and water resources and improving the reclamation condition of irrigated lands, improving the technologies of effective use of fertilizers and water. In this regard, one of the important tasks is to conduct scientific research

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aimed at improving the methods of improving the ecological and reclamation condition of irrigated lands, including the cultivation of forage crops that are resistant to salt and drought, and low water consumption.

In our republic, in the plain regions, including the irrigated farming region of the Republic of Karakalpakstan, comprehensive measures are being implemented to ensure the sustainable development of all sectors of the agricultural sector and improve methods of efficient water use. In this regard, taking into account, in particular, the negative consequences of the situation that has arisen in the lower reaches of the Amu Darya over the past 40 years, it is necessary to improve the ecological and reclamation condition of irrigated lands and improve methods of efficient water use. To implement this task, including the development of resource-saving irrigation of crops and water use methods, scientific research is of great importance. Description of irrigated lands in the Chimboy district of the Republic of Karakalpakstan by salinity level. The total area of irrigated lands in the district is 46,910.0 hectares, of which 41,576.8 hectares (88.6%) are saline to varying degrees.

Non-saline soils account for 5333.2 hectares of irrigated land in Chimboy district, or 11.4%. Slightly saline soils account for 15365.3 hectares of irrigated land in Chimboy district, or 32.8%. The salinity type is chloride-sulfate and sulfate. Moderately saline soils account for 13390.4 hectares of irrigated land in Chimboy district, or 28.5%. The salinity type is chloride-sulfate and sulfate. Strongly saline soils account for 3871.5 hectares of irrigated land, or 8.4%. The salinity type is chloride-sulfate and sulfate. The area of very strongly saline soils is 8949.6 hectares, or 19.1%. Abdukarimov D.T and others [1] agricultural crops grown on weak, medium and strong saline soils (beets, alfalfa, white sorghum, sunflower, resistance of millet) to the effects of salt, productivity and output quality is studied and scientifically substantiated. Soils are mostly moderately saline, sometimes weakly saline. Soils absorb the capacity is 8-11 mg-eq in 100 grams of soil.

D.G Akhmedjanov [2], millet was planted after winter wheat in an experiment. First, straw and wheat chaff were cleaned. Then the field was irrigated lightly (500 m3/ha). When the ground reaches 14-16 cm. in depth chiselled and millet was planted in its wake. Sowing rate is 14 kg/ha. But taking into account the replanting, the rate of sowing is 20 kg/ha. increased. Millet is planted in narrow rows at a depth of 4-5 cm using a seed drill planted. (We remind you that the rate of sowing on irrigated land is 24-30 kg/ha. Gray meadow soils are in the district form the basis of irrigated agriculture and are fully utilized in practice. These soils are distributed in the areas adjacent to the river plains. Soil-forming parent rocks consist of deluvial-proluvial loess and loess. Mechanic to the composition according to soils heavy and medium light sand and sand layers are identified below the sandy, agroirrigated layer. B.B. Tokhtashev., U. Norkulov., B. Izbosarov [3] of According to information, kura is weak, average and strong of agricultural crops grown in saline lands salty impact resistance, yield and product to quality significant the degree of change is studied.

According to the amount of humus, the soils are low and moderately supplied. Its amount is 0.8-1.2% in the sedimentary layer, it decreases to 0.3-0.4% depending on the layers (4.0-5.0% SO_2), its amount is 6.0-7 increases to 0%. Calcium carbonate ($CaSO_3$) is predominant in carbonates. Some irrigated bog soils are subject to irrigation and wind erosion.

According to D. Yormatova [4-6], in order to solve the problem posed, the salt tolerance, yield and product quality of agricultural crops grown in weak, medium and strong saline soils (white sorghum, species and varieties) are studied and scientifically substantiated. Technologies for growing these crops are developed depending on the soil and climatic conditions and salinity levels [7-10]. As a result of studying the technology for growing salt-tolerant crops in saline soils, water used for salt leaching and expenses related to salt leaching are saved, and the cost of the grown product is reduced. Most importantly and the relevance of the chosen topic is that scientific foundations are created for growing salt-tolerant agricultural crops in these (saline) soil conditions. This Crop cultivation technologies are developed based on soil and climate conditions, depending on salinity levels.

- in some fields, collecting and primary ditches were built without a project;
- farmers and peasant farms lack funds to repair existing ditches and carry out other current work.

2 Materials and Methods

The purpose of the study is to develop, conduct and determine the feeding and irrigation regime that ensures the rapid growth, development and high grain yield of forage crops in the saline lands of the northern zone of the Republic of Karakalpakstan, taking into account the limited availability of water resources. Agrochemical, agrophysical properties of soils, norms and terms of irrigation of Naiman and Millet, water consumption, plant growth and development and grain yield, the effect of economical irrigation regimes on protein and quality of forage crops. The objectives of the study are:

-to determine the initial agrochemical state of the soils of the experimental plots (the amount of humus and total and mobile forms of basic nutrients (NPK);

-to determine the changes in the water-physical properties of the soil during the cultivation of white rye and millet under different irrigation and mineral feeding regimes;

-to determine the degree of soil salinity and the effect of applying mineral fertilizers on the change in harmful salts in saline soils [6];

-to determine the total amounts of nitrogen, phosphorus and potassium in the tops of the crops at the end of the growing season according to the experimental options;

- determination of mobile forms of nitrogen, phosphorus and potassium in the soil (0-30 and 30-50 cm layers) at the beginning and end of the crop growing periods according to experimental options;.

-conducting phenological observations during the growth and development periods of crops planted according to experimental options;

-determine the effect of irrigation and mineral nutrition regimes on the yield of white rye and millet and on the quality indicators of grain and seed;

-determine and evaluate the effect of irrigation and mineral nutrition regimes on the yield and quality of white rye and millet crops;

-at the end of the experiments, determine the economic efficiency of agronomic measures (soil cultivation, sowing, nutrition, irrigation) of white rye and millet crops.

Biometric measurements of plant, soil and plant samples in research laboratory analyses, phenological observations "Methods of conducting field experiments", the data obtained from the results of researches are analyzed mathematically and statistically according to V.A Dospekov's "Methods of conducting field experiments" method. In the course of the research, optimal feeding and optimal watering regimes of fodder crops sorghum "Nayman" and millet "Shaftoli" are determined, for example, soil moisture before irrigation in relation to ChDNS, 65-70-60%, 70-75- 65% and when irrigation is applied with a soil layer of 30-50-50 cm, it is possible to grow high-quality grain crops from white sorghum and millet. Get out and go to the farmer's fields recommended as a definitive guide.

According to climatic conditions, Chimboy district belongs to the semi-arid continental climate group. Republic the climate is sharply continental and extremely dry with separate stands This is the area of the temperate air mass change in seasons, transpiration in hot times of the year of processes acceleration, and in cold periods the polar front Asian current increase is characteristic. Therefore, it is dry and hot in Chimboy district in the summer months. and extreme in winter unsettled cold weather prevails. Air the average annual temperature is 13.5^0 C, and the average January temperature is minus $3.2\text{-}4.4^0$ C in the north and northwest of the desert . In Chimboy district, the hottest month is July, the average monthly temperature is plus 27^0 C, and from October and November, the temperature sharp decline observed.

You are cold of days duration is 227 days. Air temperature from $+5^0$ C more than has been the duration of the active vegetation period is 245-272 days by year, this effective in the period temperature The sum of ($+5^0$ C) is 4700^0 C-5540^0 C. Heat-loving active vegetation of plants, including cotton the total temperature above $+10^0$ C at the beginning of the period is $4270\text{-}5050^0$ C. this indicators in turn, to the district's thermal (heat) resources rich from being indicates.

Average annual rainfall ranges from 242-276 mm to 448-559 mm. the maximum amount of atmospheric precipitation in one day is 29.8-33.3 mm. The maximum amount of precipitation falls on the winter-spring months. Soils of Chimboy district are distributed in the region of light-colored alliobial soils. Republic soil consists of irrigated light gray, gray, grassy-gray soils. They are clay of proluvial-deluvial deposits covered with sands of sub-mountain slope plains lower distributed in the Humus and mineral in pale gray soils, the amount of nutrients is very low. The amount of humus in the soil layer is 0.6-0.8%, sometimes is 1%. Gross nitrogen the amount is also very small. According to the mechanical composition, the soils are heavy and medium sugary, sometimes lower on the horizons layers of sand and gravel are found. Irrigation water is the main source of groundwater balance input, therefore, the reclamation of irrigated lands 75-80% of irrigated lands of Chimboy district are naturally saline lands, where, despite the relative sufficiency of the ditch network, variously mineralized seepage waters are located close to the surface of the earth, that is, the hydromorphic and semi-hydromorphic reclamation regime is preserved. Under such conditions, seepage waters evaporate rapidly and the process of seasonal salt accumulation occurs regularly.

According to the results of research conducted in the experimental field, the bulk density of the soil at the beginning of the vegetation period is 1.38 g/cm3 in the arable layer of 0-30 cm and 1.40 g/cm3 in the layer of 30-50 cm.

By the end of the vegetation period, the bulk density of the soil in control variant 1 was 1.38 g/cm3 in the 0-30 cm layer and 1.39 g/cm3 in the 0-30-50 cm layer (Table 1).

Table 1. Hydro-physical properties of the soil of the experimental site.

Layers, sm	Voluminous mass, g/sm^3	Porosity, %	Minimum moisture content by weight, %
0-30	1.38	48.6	23.8
30-50	1,40	47.0	23,4
50-100	1.39	46.8	24,2

is running out of water rational use of land and water resources and irrigation y lands it is of particular importance to carry out research and development activities aimed at improving the land reclamation situation, improving the technologies of efficient use of fertilizers and water. In this regard, including salt- and drought-resistant fodder crops that consume less water cultivation one of the important tasks is to carry out scientific research aimed at improving the methods of improving the ecological and meliorative condition of irrigated lands. In recent years, many exemplary works have been carried out in the field of reclamation of saline lands in the republic. Reclamation of saline lands and the technology of cultivation of field crops there are systematically studied reaching the level of state importance. Taking care of each field crop based on specific soil and climate conditions is a guarantee of a high and quality harvest.

3 Results

Rapid growth and development of fodder crops and obtaining a high grain yield in the saline lands in the northern zone of the Republic of Karakalpakstan provider development of feeding and watering procedures, conduct and determination in connection with limited water resources. Selection of saline lands of Chimboy district, soil salt washing standards study;

- to determine the initial agrochemical condition of the soils of the experimental areas (the amount of humus and the total and mobile forms of basic nutrients (NPK);
- water-physical properties of the soil of the field;
- growth and development of the choir;
- to determine the level of salinity of the soil and the effect of the use of mineral fertilizers on the change of harmful salts in saline soils;
- conducting phenological observations during the growth and development periods of planted crops according to experimental options;
- irrigation and mineral nutrition of order white corn and millet the plant harvest collect and grain and seed quality indicators effect determination;
- in the northern zone of the Republic of Karakalpakstan salted irrigated optimal standards for feeding fodder crops grown on land and irrigation regime in relation to ChDNS Determining the effect on changes in water-physical and agrochemical properties of soil when irrigated in the order of 65-70-60 %, 70-75-65%, development and limited water resources in conditions of water scarcity carry out in connection.

To calculate the sorghum yield, the plants in each plot and a specific pagon meter (at 16.6 pm) were harvested and weighed wet. When calculating the corn yield, the wet mass and dry mass of the corn taken from the calculation area were calculated. Initially, the number of plants at 16.6 pm was counted. This indicator was the same in all delyankas and amounted to 250 plants. Then, the green mass of the plant in this area was calculated separately, and then the dry mass (Tables 2, 3, 4).

Table 2. Calculation of green mass and dry silage yield of sorghum. (2023y).

No	Returns	Productivity, 16.6 pm, g		Productivity, s/ha	
		green mass	dry mass	green mass	dry
in a section of medium salinity soils					
1	Return 1	27,700	7540	517.1	105.4
2	Return 2	26,580	7316	509.6	103.1
3	Return 3	26,700	7350	511.4	101.5
	Average:	**26,865**	**7371**	**513.1**	**104.3**

Productivity in moderately saline soils: NSR=16.4s/ha. NSR=3.20%

Table 3. Green mass and dry silage yield of millet (2023y).

No	Returns	Number of plants in $1m^2$	The number of plants in 1 hectare, mln piece	g in $1m^2$	Productivity, s/ha		
				green mass	dry mass	green mass	dry
1.	Return 1	215	2,150	4300	614	430	61.4
2.	Return 2	178	1,780	3560	508	350	50.8
3.	Return 3	225	2,225	4500	642	450	64.2
	Average	197	1,963	4440	562.2	392.5	56.2

Productivity NSR=0.97s/ha in moderately saline soils. NSR=3.5%

Table 4. Salted productivity of qx crops under soil conditions.

No	Options	Yield obtained by repetitions, s/ha.		Average yield, s/ha.		
		I	II	III	IV	
	Moderately saline soils					
1.	Nayman	675.3	660.7	687.3	655.4	**669.7**
2.	Shaftoli	61.4	50.8	64.2	48.5	**56.2**

As you know, salty washing in the process of soil the upper fertile part and the mineral and organic substances in it are washed away to a certain extent. This soil to his condition to bring for of course organic fertilizer after saline washing put is recommended. That's it look held save it at the beginning of the experimental field it will be necessary to prepare.

4 Conclusion

In conclusion, it can be said that in recent years, a lot of exemplary work has been carried out in the Republic in the field of reclamation of saline lands. The technology of reclamation of saline lands and the cultivation of field crops in them is being systematically studied and is reaching the level of state importance. The care of each field crop based on specific soil and climatic conditions is a guarantee of high and high-quality yields. In order to solve these problems, it is necessary to study the drought resistance of crops planted for fodder on saline lands and study their impact on crop productivity when combined with feeding [11].

It is not wrong to say that the increasing water shortage in the Republic from year to year is having a certain impact on irrigated agriculture. The decrease in water reserves and the increase in the need for it, first of all, have a negative impact on the reclamation of saline lands. In practice, the failure to carry out 2-3 salt washing operations on time is considered one of the main reasons for water shortages. Therefore, the volume of saline soils is increasing. The current total irrigated area is 4.3 million hectares, of which 46-50% are saline areas. This situation was also clearly noticeable in our experience.

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