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Fundamentals of Effective use of Water Resources of Irrigated Lands in South Karakalpakstan

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ABSTRACT: The problem of global climate change is on the agenda of mankind, with not only the average annual temperature rise on the planet, but also changes in the entire geosystem, the rise of the world's oceans, melting ice and permanent glaciers, increasing uneven rainfall, changing river flow patterns and climate instability. other changes involved.

INTRODUCTION.

As a result of global climate change, the area of glaciers in Central Asia has shrunk by about 30 percent over the last 50-60 years. It is estimated that the volume of glaciers decreases by 50 percent when the temperature rises to 20C and by 78 percent when heated to 40C. According to estimates, by 2050, water resources in the Syrdarya basin are expected to decrease by 5%, and in the Amudarya basin - by 15%. The total water deficit in Uzbekistan until 2015 will reach 3 billion cubic meters. more than 7 billion cubic meters by 2030. cubic meters, and by 2050, 15 billion. cubic meters.

The analysis shows that over the past 15 years, the water supply per capita has decreased from 3,048 cubic meters to 1,589 cubic meters. At the same time, the population of the Republic will increase by an average of 650-700 thousand people a year, and by 2030 will reach 39 million. Their demand for quality water is estimated at 2.3 billion cubic meters. 2.7-3.0 billion cubic meters. cubic meters (18-20 percent).

Climate change leads to 10-15% evaporation of water from water surfaces, and 10-20% more water consumption due to increased plant transpiration and irrigation standards. This leads to an average 18% increase in non-renewable water consumption. This will undoubtedly complicate the further growth of agricultural production.

IRRIGATION REGIMES OF COTTON

One of the main issues to be addressed during the study of the irrigation regime and the development of recommendations for its application is that the pre-irrigation moisture in the soil is at the lowest moisture capacity, which requires regular irrigation. Plants consume different amounts of water during the irrigation period, so a specific irrigation regime has been established for each transition phase of development, taking into account soil conditions.

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S.N.Ryjov [26; P. 196] theoretically substantiated the determination of the rate of irrigation of cotton. He found that the main root mass of the cotton was spread out to about one meter, and that most of the water was taken from a depth of 30-90 centimeters for transpiration.
M.X.Khamidovning [32; Based on his experiments, it was found that when cotton is grown in low-salinity meadow heavy sandy soils with a groundwater level of 1.2-1.6 m, the most favorable conditions are formed when the soil moisture before irrigation is 70-80-60% relative to ChDNS. ekan. Such a soil moisture regime is created by nutrient irrigation and 4 irrigations according to the 1-3-0 scheme, 700-900 m3 / ha irrigation norms and 4200 m3 / ha seasonal irrigation norms (including nutrient irrigation). With such an irrigation regime it is possible to get a cotton yield of up to 45 ts / ha.

RESEARCH STYLE AND EXPERIMENTAL SYSTEM

The research was conducted on the irrigated lands of Reimbay Boshliq farm in Beruni district. Collector-drainage networks have been built on the lands of all farms, irrigation networks are of engineering nature. To irrigate agricultural crops, water is delivered to the fields through horn and arrow ditches and the crops are irrigated side by side. The soil of the farm is weak and moderately saline.

Table 1.
Field experiment implementation system

#	Pre-irrigation soil moisture, in% of the Border Field Moisture Capacity	Irrigation rate, m^3/ha
1	Production control	Actual measurements
2	70-70-60	70-100-70 см қатламдаги намлик дефицити бўйича
3	70-80-60	
4	70-80-60	Moisture deficit in the 70-100-70 cm layer was increased by 30%.

The following observations and research are being conducted in the cotton experiment field:

- study of soil conditions of the experimental field. To do this, before sowing the seeds, a complete soil section was dug to the depth of groundwater in the experimental field, soil samples were taken from the genetic layers of the section and its mechanical composition, humus, nitrogen, phosphorus and potassium from soil nutrients, and soil salts were determined;

- the volumetric weight of the experimental field soil was determined annually at the beginning and end of the growing season using a steel cylinder with a height of 10 cm on a layer of 0-100 cm;

- the water permeability of the experimental field soil was determined annually at the beginning and end of the growing season on a cylindrical circle based on the Nesterov method;

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- The field moisture capacity of the experimental field soil was determined before the start of the field experiment by the Rozov method, by filling a 2x2 m area with 2000-3000 m3 of water every 10 cm to a depth of 0-100 cm;

- study of the depth and level of mineralization of the experimental field groundwater level. To do this, observation wells will be installed in the third variant of the second return and in the control field. Each time before and after irrigation, groundwater samples are taken from the observation wells using special devices, and in the laboratory, the amount of salts in it is determined using a conductometer. Groundwater level depths in observation wells were measured every 10 days;

- changes in soil moisture of the experimental field were detected at the beginning and end of the growing season to the groundwater level, before and after irrigation (3 days) at a depth of 0-100 cm in a digital laboratory measuring moisture;

- water consumption in the experimental field was measured using a water meter "Chippoletti" (0.50m) and determined by calculation in accordance with the table;

- to determine the level of salinity of the soil of the experimental field in all variants of the experiment was determined using a conductometer at the beginning and end of the growing season every 0-10 cm of the 0-100 cm layer of soil;

Agrotechnical work in experimental fields

It is located on the farm "Reimbay boshliq" in Beruni district of the Republic of Karakalpakstan. Soils - medium sandy soils.

According to the data on agro-technical measures in the experimental field, on December 4, 2017, November 28 and November 30, 2017-2019 at a depth of 35-40 centimeters, the autumn soil layer was plowed every year. From February 24-26 to March 6, the field was leveled annually. Floors and ceilings were removed from 22 to 27 February to prepare the field for saline washing. The experimental field was washed twice on a small floor (0.03-0.05 ha) at a saline leaching rate of 2400-2600 m3 / ha twice a year: from 26-28 February and from 14 to 18 March. After tillage, on April 16-21, in addition to preparing the soil for planting, nitrogen N-30 kg / ha, phosphorus P-100 kg / ha and potassium K-50 kg / ha were applied in pure form, chiseled twice longitudinally and transversely and 3 times. storm and 2 times a quality break. On April 18-22, 2018, on April 19-21, 2019, on April 18-20, 2020, the cotton variety “Khorezm-127” was planted.

Data on agro-technical measures in the experimental field of Beruni district of the Republic of Karakalpakstan are given in Table 1.1.

Table 1.1.
Agrotechnical measures for cotton cultivation in experimental fields

#	**Agrotechnical measures**	**Terms of transfer**		
		Experiment 1	Experiment 2	Experiment 3
1	Autumn plowing	4.12. 2017	2.12.17	5.12.17
2	land leveling	26.02. 2018	1.03.18	9.03.18

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3	Preparing the soil for saline washing	27.02. 2018	2.03.2018	10.03.2018
4	Brine wash	28.02.2018; 18.03.2018	3.03.2018; 19.03.2018	12.03.2018
5	Plowing	12.04.18	13.04.18	10.04.18
6	Apply ammophos fertilizer (100 kg / ha, pure)	21.04.18	17.04.18	20.04.18
7	Chiseling, plowing and mulching	21.04.18	17.04.18	21.04.18
8	Planting	22.04.18	18.04.18	22.04.18
9	Germination of cotton	30.04.18	27.04.18	29.04.18
10	Weeds weed	10.05.18- 30.05.18	12.05.18	11.05.18
11	Cultivation	05.05.; 19.05; 31.05.	8.05, 31.05	05.05; 24.05.
12	Unification	06.05.18	07.05.18	09.05.18
13	Feeding	21.04.; 05.05.;	18.04; 8.05	22.04.18; 05.05.
14	Defoliation	1.09.2018	3.09.2018	3.09.2018
15	Ingathering	15. 09.; 29. 09.;08.10.	26.09.; 09.10.; 24.10.	20.09.; 06.10.; 21.10.

Classification and mechanical composition of experimental field soils by genetic layers

Before carrying out the experimental work, a section of soil was excavated in full profile. The morphological definition of the genetic layers of the soil up to groundwater is as follows 2.1. - 2.1.1 - are given in the tables.

Table 2.1.

Experimental field Soil classification by genetic layers (Experiment 1)

Genetic layer, cm	**Soil morphological characteristics**
0-39	- gray, heavy sand, dry to 0–5 cm, the lower part is poorly moistened, compacted, there are many semi-rotten root remnants, the paths of earthworms and their waste are encountered, the passage on the color is flat.
39-75	- gray, darker than before, medium sand, plant root remnants, the transition in color is noticeable.
75-92	- dark gray, heavy sand, root remnants, sharp in color.
92-118	- gray, medium sandy, moist, homogeneous, root remnants are rare, the transition in color is noticeable.
118-168	- gray, light sandy, sandy loam, very moist, homogeneous, porous.

The mechanical composition of the soil of the experimental field planted with cotton was determined in soil samples taken by genetic layers from the excavated soil section at the beginning of the study. According to the laboratory analysis, the mechanical composition of

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the experimental field soil, according to N. Kachinsky's description, is a layer of heavy sand at a depth of 0-39 cm, a layer of heavy sand at a depth of 39-75 cm, a layer of medium sand at a depth of 75-92 cm, a medium layer at a depth of 92-118 cm. sandy soils. It was observed that the mechanical composition of the experimental field soil is easing downwards, which is important for the use of groundwater by plants (Table 2.1.1).

Table 2.1.1.
Mechanical composition of experimental field soil (Experiment 1)

Layers, cm	**> 0,25**	**0,25-0,1**	**0,1-0,05**	**0,05-0,01**	**0,01-0,005**	**0,005-0,001**	**< 0,001**	**< 0,01**	**According to N. Kachinsky**
0-39	0,70	3,74	14,65	34,35	12,72	21,57	12,27	47,56	heavy sand
39-75	0,56	3,60	17,65	35,25	11,05	18,22	13,67	49,94	heavy sand
75-92	0,22	2,19	14,72	33,25	15,50	19,65	14,47	39,62	medium sand
92-118	0,25	3,06	21,25	36,65	10,37	15,62	12,80	38,79	medium sand
118-168	0,28	3,15	20,07	36,04	14,39	13,77	12,30	29,45	light sand

Table 2.1.2
shows the characteristics of the soil section at the Beruni farm “Reimbay boshliq” of the Republic of Karakalpakstan.

Genetic layer, cm	**Soil morphological characteristics**
0 - 20	- dark brown, medium sandy, dense, rotten root remnants towards the bottom layer, there is a transition along the color.
20 - 43	- is more dependent, the plant is exposed to root remnants.
43 - 52	- қўнғир рангли, ўрта қумоқ, илдиз қолдиқлари учраб туради.
52– 65	- оқимтир тупроқ, ўртақумоқ, сизирарсиз нам, биржинсли, илдизқолдиқларикамдан-камучрабтуради, рангибўйичаўтишисезиларли.
65 - 85	- sand in the layer, medium sand, sandy soil, very moist, homogeneous, porous.
85 - 100	- light sand, loamy soil, very moist, mixed with sand.
100 - 150	- black soil, muddy soil. Water outlet was provided.

According to N. Kachinsky's description, the mechanical composition of the experimental field soil is included in the description of a layer of medium sandy soil with a depth of 0-85 cm and a layer of light sandy soil with a depth of 85-118 cm (Table 2.1.3).

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CONCLUSION

The following preliminary conclusions can be drawn from field experiments on the development of scientifically based irrigation procedures for cotton in the alluvial soils of the ancient irrigated meadows of the Beruni district of the Republic of Karakalpakstan:

1. At the beginning of the experiments, the volumetric weight of the soil was 1.36-1.38 g / cm3 (Experiment 1), 1.35-1.37 g / cm3 (Experiment 2) and 1.31-1 in the 0-30 cm layer to be plowed. , 33 g / cm3 (Experiment 3) and 1.41–1.42 g / cm3 (Experiment 1) in the 0–100 cm layer, 1.37–1.39 g / cm3 (Experiment 2), and 1, 32–1.34 g / cm3 (Experiment 3). At the end of the growing season, the volumetric weight of the soil increased in all experiments under the influence of cotton care and various irrigation regimes. The lowest soil compaction was in variant 3 of the experiments, which was 0.01–0.02 g / cm3.

2. At the beginning of the experiments, the water permeability of the soil for 6 hours was 963-996 m3 / ha or 0.268-0.277 mm / min (Experiment 1), 1258-1300 m3 / ha or 0.349-0.361 mm / min (Experiment 2) and 1462- 1501 m3 / ha or 0.406-0.417 mm / min
(Experiment 3). By the end of the growing season, soil water permeability decreased in all variants, such as volumetric mass, but in 3 variants where soil moisture before irrigation was 70-80-60% relative to ChDNS, this figure was 131–134 m3 / ha or 0.037–0.038 mm / ha. min (Experiment 1), 126-130 m3 / ha, 0.035-0.036 mm / min (Experiment 2) and 154-163 m3 / ha, 0.043-0.045 mm / min
(Experiment 3).

3. In the experimental field, when irrigating cotton, the soil moisture before irrigation was 70-80-60% relative to ChDNS. In variant 3, cotton germination was irrigated once with a watering rate of 604-620 m3 / ha during the flowering period, 590-629 during the flowering period. m3 / ha was irrigated four times with irrigation norms and and during the ripening period the crop was irrigated once with 742-768 m3 / ha irrigation norms. The seasonal irrigation norm was 3756-3856 m3 / ha, or 1466-1542 m3 / ha of river water was saved compared to the control option and a higher yield was obtained from cotton.

4. At the beginning of the growing season, the thickness of cotton seedlings was 95.6-97.6 thousand bushes per hectare, and by the end of the growing season, the thickness of seedlings was 94.6-94.9 thousand bushes per hectare, the decrease was lower than other options. As of September 1, the length of cotton is 91.4-92.9 cm, the number of branches is 11.5-11.9, the number of pods is 10.4-11.1 and the number of open buds is 4.4-4.5. thus, the growth and development is better than the other options of the experiment, and the yield branches compared to the control option
0.7-1.7 pieces, the number of pods increased by 0.6-0.9 and the number of opened pods increased by 0.4-0.6.

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