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DETERMINING THE IRRIGATION NORM AND THE TIME BETWEEN IRRIGATION IN DRIP IRRIGATION OF COTTON IN THE CONDITIONS OF THE MIDDLE REGION OF THE KASHKADARYA BASIN.

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Abstract:

In this article, the analytical result of the use of drip irrigation, which is currently used in cotton cultivation, is presented. The positive aspects of the technology of using drip irrigation in the cotton field for effective and rational use of water resources are highlighted. The demand for water resources is increasing year by year due to factors such as population growth, increased food demand, expansion of industrial production, and climate change in the countries of the world. As a result, the world itself is experiencing water shortages. Taking into account the water demand of cotton grown in Kashkadarya region, the standard of use of available data from weather station data using FAO method CropWat 8.0. Based on the mechanical composition of the soil, the software of seepage and cleaning, the mineral resources of cotton are obtained. The results of scientific research conducted by scientists in cotton fields were analyzed in Kham. In addition, scientifically based irrigation methods of water-saving irrigation technology of cotton were developed according to the generally accepted hydromodule region for the conditions of Kashkadarya.

Keywords: FAO methodology, CropWat program, hydromodule, cotton, Kashkadarya, irrigation, pushing method, water-saving irrigation technology, Bukhara 102.

INTRODUCTION: In recent years, the effective use of water resources, improvement of the water resources management system, modernization of water management facilities and improvement of diversion works are being carried out. However, global variables, water resources, the supply of water resources is increasing year by year [1]. In our republic, in 2022, the leveling of 200,000 hectares of agricultural land with the help of laser leveling equipment will be practically restored in the way of water-saving technologies on an area of 230,000 hectares.

During 2022, republican production was launched on a total of 463,700 hectares, 89,800 hectares of drip irrigation, 16,100 hectares of rain irrigation, 5,600 hectares of discrete irrigation technologies, and 243,000 hectares of laser irrigation. helps to radiate.

At the same time, 72.9 thousand hectares were irrigated with flexible pipes, 36.1 thousand hectares were irrigated with a film. Also, drip irrigation technology in cotton fields will be provided to agricultural enterprises by road in 2022 for 71.3 billion. was allocated to subsidies of soum [2].

Uzbekistan's agricultural production includes cotton production. Today, there are 32-34 million people worldwide. per hectare, and in our Republic 1.05-1.3 mln. Cotton is grown per hectare. 30-35 centners are produced from one hectare of cotton field, and 6000 cubic meters of water and 190 kg of fuel are used. In addition, the total cost of one hectare of cotton cultivation is 980,000. organization of soum. the big one is made when the cotton is 60 or 90 cm long [3].

Current agrotechnical processes are carried out in the existing cotton cultivation technology;

- give drinking water;
- fertilization (mineral and organic);
- plowing (plowing depth 35-45 cm);
- grinding, leveling;
- harrowing;
- to make powder;
- planting;
- processing between rows (at least 4 times during the vegetation period);

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- chemical protection;
- defoliation;
- harvest;
- cleaning from cotton stalks.

Alleviation of water scarcity in irrigated lands, investigation of agricultural crops, study of irrigation methods, techniques and technologies on soil water-physical properties, growth, production and quality in our republic Khamidov M.Kh. Isayakbaev K. B.Sh., Koshekov R.M., Avlyakulov M., Shakirov B., Norkulov U., Satlarov O., Abdullaev I., Kazbekov J., Bekchanov M., Bekmirzaev G. and Molden D.J., Lamers J., Martius. C., Ouddane B., Beltrao J., Mohan Reddy Junna, etc. scientific researches have been carried out on a wide scale.

THE MAIN PURPOSE OF THE STUDY: According to the mechanical composition produced on the basis of light ash gray soils of "Ernazarova Dildora" farm in Qamashi district of Kashkadarya province, production of medium-sized seepage water 3.5 - 4.0 m, mineralization of seepage water 5-5.5 g/l conditions, cotton filling methods. Working on determining the order of irrigation and the number of irrigations, the time of irrigation and the days between irrigations consists in developing scientific and practical recommendations.

TASKS OF THE RESEARCH:

- determination of soil conditions (type, mechanical structure, water-physical properties and fertility) of the fields;
- determination of hydrogeological and reclamation conditions of the fields;
- To determine the scientifically based irrigation procedure in the method of cotton filling in conditions of alluvial, strongly saline soils of Bukhara region;
- It is to increase the level of sugorishes during newspaper and sugorishes in the fertile soils of Qamashi district of Kashkadarya Province.

RESEARCH METHODOLOGY: Support in field management work and phenological observations in the cotton field at the "Research Institute of Agrotechnologies of Cotton Selection and Seed Production" "Creation of methods for studying agrophysical, agrochemical and microbiological properties of production in cotton fields" [4].

Also, SropWat 8.0 program developed by FAO was used to determine the water demand of crops [5].

Results and their discussion: researches on agrophysical, water-physical properties, volume mass, porosity, water permeability of the soil of the experimental field were carried out. Soil samples at a depth of 65-92, 92-120 cm were taken and soil density and relative humidity were determined in laboratory conditions.

Soil samples from field experiments. Table 1

The results of the experiments conducted in the experimental field in Qamashi district of Kashkadarya region. Layer depth.cm	Buks number	Buks number	The volume of the cylinder is sм^3	Density of soil, g/cm^3				
				The weight of the dried soil together with the byuks	Bucks weight	Net weight of soil after drying	Volumetric mass of soil g/cm^3	Volumetric mass average g/cm^3
	35	0	97.19	171.54	55.40	116.14	1.19	
0-12	12	1	96.07	203.04	48.80	154.24	1.60	1.40
	37	3	92.66	185.30	55.30	130.	1.40	
	18	0	97.19	191.21	54.00	137.21	1.37	
12-41	5	1	96.07	222.40	54.40	168.00	1.75	1.61
	11	3	92.66	205.76	46.90	158.86	1.71	

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	13	0	97.19	204.39	56.10	148.29	1.53	
41-65	31	1	96.07	202.63	56.20	146.43	1.52	1.54
	10	3	92.66	200.92	55.30	145.62	1.57	
	16	0	97.19	195.10	55.40	139.70	1.44	
65-92	32	1	96.07	186.10	53.10	133.00	1.38	1.43
	10	3	92.66	190.83	54.50	136.33	1.47	
	33	0	97.19	197.57	55.60	138.97	1.43	
92-120	29	1	96.07	193.06	50.40	142.66	1.48	1.48
	9	3	92.66	197.74	56.20	14.54	1.53	

Determination of the relative humidity of the soil sample taken for analysis Table 2

Layer depth	Buks number	Mass of soil in grams					Moisture relative to mass.	Average humidity indicator.
		The weight of the soil together with the buks		Bucks weight	Tied up moisture	Mass of dried soil		
		Mass of soil after drying	Dry mass of soil					
0-12	35	177.92	171.54	55.40	6.38	116.14	5.49	
	12	209.42	203.04	48.80	6.38	154.24	4.13	
	37	194.24	185.60	55.00	8.64	130.60	6.61	5.41
12-41	18	206.52	191.21	54.00	15.31	137.21	11.16	
	5	241.72	228.40	54.40	19.32	168.00	11.50	
	11	223.64	205.76	46.90	17.88	158.86	11.26	11.31
41-65	13	224.74	204.39	56.10	19.85	148.29	13.39	
	31	223.78	202.63	56.20	21.15	146.43	14.44	
	10	223.38	200.92	53.30	22.46	145.62	15.42	14.42
65-92	15	214.80	195.10	55.40	19.70	139.70	14.10	
	32	205.91	186.10	53.10	19.81	133.00	14.89	
	10	210.89	190.83	54.50	20.06	136.33	14.71	14.57
92-120	33	216.31	194.57	55.60	21.84	138.97	15.71	
	29	214.12	193.06	50.40	21.06	142.66	14.78	
	9	216.80	197.74	56.20	19.14	141.54	13.52	14.67

The obtained results show that the average volume of soil at a depth of 0-12 cm is 1.40 g/cm 3 at a depth of 12-41 cm 3 1.61 g/cm 3 at a depth of 41-65 cm 1.54 g/cm 3 at a depth of 65-92 cm 1.43 cm 3 at a depth of 92-120 cm It turned out to be 1.48 cm3. When determining the mass of soil in grams, it was found that the average indicator of moisture was 5.41 at 0-12 cm, 11.31 at 12-41 cm depth, 14.42 at 41-65 cm depth, 14.67 at 65-92 cm depth, and 14.67 at 92-102 cm depth. Bukhara-102 variety of cotton was planted in the irrigated lands of "Ernazarova Dildora farm" located in Qamashi district of Kahkadarya region.

Field experiment scheme Figure 1

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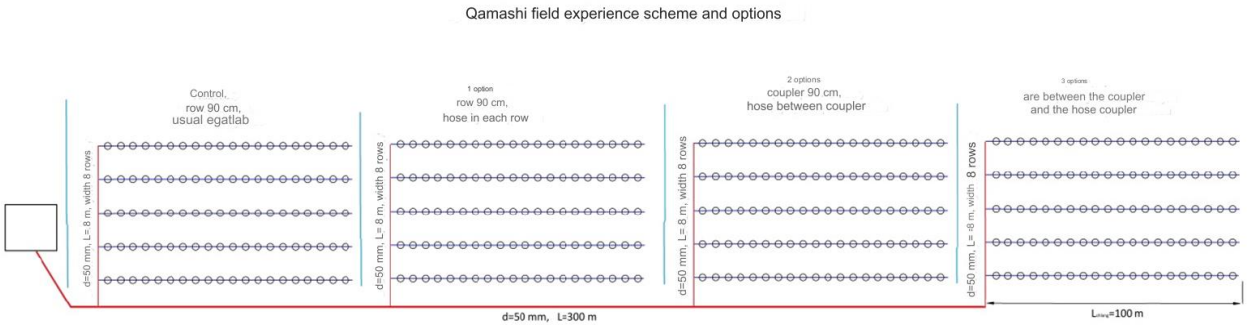
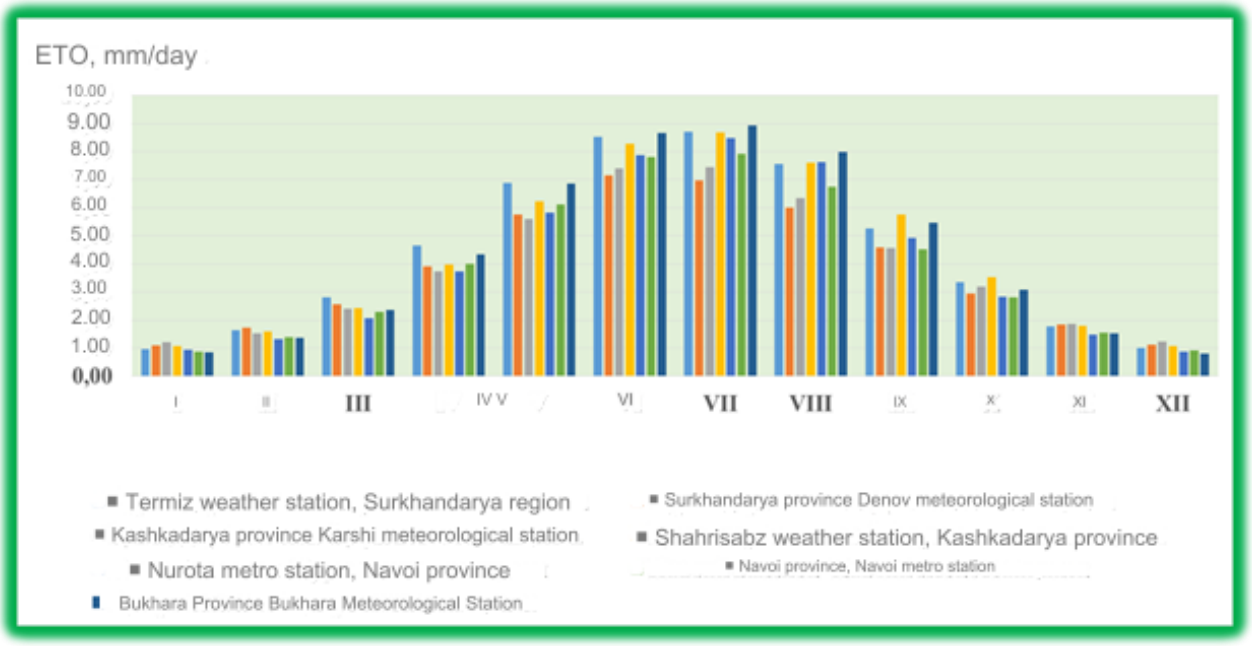


The total length of the experimental field was 400 meters, and 4 different irrigations were carried out. They are as follows. Option 2: cotton was planted on a 90-cm edge and a hose was thrown between the edge. Option 3: cotton planted in double rows under a film was drip-irrigated. In determining the water demand of cotton during the vegetation period, the standard evapotranspiration (ETo), crop coefficient (Ks), agricultural crop characteristics and evapotranspiration (ETs), calculation of the total water consumption of cotton was calculated based on the adapted Penman-Monteita method, and air temperature, humidity, data on wind speed and duration of sunshine were used and the average daily evaporation during the vegetation period was found to be 7.45mm.

where ETo-standard evapotranspiration [mm day-1]; PH-plant net radiation falling on the soil [Mj m-2 day-1]; G-soil heat reading density, [MJ m-2 day-1]; Average daily temperature of the air at a height of 2 m above the ground [°C]; u2-er is the speed of the wind at a height of 2 m above the wind [m s-1]; saturated vapor pressure [kPa]; actual pressure of steam in ea-mal [kPa]; (es -ea) vapor saturation pressure deficit [kPa]; D-vapor pressure curve crack gradient [kPa °C-1], -psychrometric stability (constant) [kPa °C-1]. Based on the reference evapotranspiration (ETo) climate sensors and weather data, the report collects the evapotranspiration of a given area and the available atmosphere, regardless of soil type. The end of weather stations located in Karshi district of Kashkadarya region was determined based on the average data of 10 years.

ETo standard evapotranspiration of crops calculated on the basis of weather station data, ETo-average daily graph 1



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One of the main issues that should be solved during the study of the irrigation procedure and the development of recommendations for its application is the establishment of the lower limit of soil moisture before irrigation. For example, cotton is demanding of water during flowering and fruiting.

IRRIGATION OF COTTON FROM GERMINATION TO FLOWERING PERIOD. *From the initial stage of tuber development to flowering, organs and roots are systematically formed. It is very important to follow the watering schedule, which ensures the vigorous development of the root system and the growth of the plant organs. In the layer where the root system of the plant is developed, the excessive increase of soil moisture will cause the tuber to shrink, and the intervals of 4-5 cm. instead of 6-8 cm. to the flesh, the branches are placed higher and it causes damage to the crop.*

Watering during flowering and fruiting. During this period, as soon as the tuber enters the flower, the surface of the leaves increases, the root system develops strongly, and the bridge deepens to 1 meter or more. As vegetative organs grow, fruit organs are formed. The roza bush evaporated more and more water. At this time, the water consumption of one hectare of field increases to 70-90 m3 per day and even more. Therefore, a large amount of water and nutrients are required. During this period, it is necessary to water the bush in such a way that the generation wound prevails over the vegetation, and the elements of the crop are preserved as much as possible in the lower and middle layers. Delaying even a little watering and the ripening of the leaves causes the swelling of the buds and nodes in the first and second layers of the bush and reduces the yield. It is also dangerous to give cotton too much water during the growing season. Because the plant grows rapidly, leaves beautiful leaves and goes away. As a result of heavy shading of the cotton and excessive soil moisture, there is a lot of spikes and nodules. As a result, both the appearance of the spade and the formation of the crop are delayed. Watering should be carried out in such a way that the flowers are gradually waiting towards the dew point, and the height of the main stem is 90-100 sm.

WATERING DURING CROP RIPENING. *As soon as Ruza enters the period of maturation, its growth processes slow down. At this time, nutrients move from the leaves and stems to the pods; 30-40 m3 of water per hectare per day is used for transpiration and evaporation from the soil surface.* [6]

Taking into account the above, the method of drip irrigation of cotton was determined by the following formul.

$$m_{nt} = 100 \times h_w \times \gamma \times \alpha \times (\beta_{adm} - \beta_{max});$$

Here Xw-calculated layer depth (m), the calculated layer depth in the first growth phase of cotton was taken as 30 cm.

$$m_{0.3} = 100 \times 0.3 \times 1.5 \times 1 \times (24 - 16.8) = 324m^3/$$

$$t = \frac{m_{nt}}{q_{dr} \times n \times \eta};$$

$$t_{03} = \frac{324 \times 1000}{1.6 \times 37000 \times 0.95} = 5.7soat$$

According to the accounting books, the amount of water used for irrigation once is 324 m3. Based on the consumption of water given once and taking into account that the daily amount of water per 1 hectare of irrigated area is on average 45-50 m3 and the limited field moisture taking into account the capacity, it was known that waterings come every 6-7 days, and it was known that the time of watering is 5.7 hours.

Watering during flowering and fruiting.

$$m_{0.5} = 100 \times 0.5 \times 1.57 \times 1 \times (24 - 16.8) = 565m^3$$

During this period, it was known that the evaporation from the irrigated guza field is 75-90 m3 per day from the data obtained from the weather station closest to the field, and the interval between irrigations is 6 days and the duration of irrigation takes into account the calculation layer it turned out to be 10 hours.

$$t_{05} = \frac{565 \times 1000}{1.6 \times 37000 \times 0.95} = 10soat$$

Planned drip irrigation period and standards. Table 3

Months	May	Juni	Juli	avgust	Total
Number of watering	1	3	4	1	9
Watered days	26.05.2023.	02.06.2023. 14.06.2023. 25.06.2023.	03.07.2023. 10.07.2023. 18.07.2023. 26.07.2023	05.08.2023	
Irrigation and seasonal watering rate	300	300	500	350	3550

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m^3/ga					

CONCLUSIONS

1. Volumetric weight, water permeability, and moisture content of soil sampled from Yernazarova Dildora farm, located in the middle region of Kashkadarya basin, were determined.
2. In all 4 variants, the growth and development of cotton was observed while watering at the same time.
3. The number of irrigations and irrigation rates were determined according to the FAO method and taking into account the calculation layer.
4. Cotton was watered 9 times during vegetation and the total amount of water was 3350m3/ha. In the 4th control field of the experiment, this indicator was 4500-5000m3
5. Hydromodule of seasonal irrigation norms of cotton in Kashkadarya region

According to the recommendations of professor N. Bespalov, it was studied that the seasonal irrigation norms of cotton are between 3300-7600 m3.

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