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EFFECTIVE AGROTECHNOLOGY OF COTTON FEEDING IN DIFFERENT IRRIGATION METHODS

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Relevance and necessity of the topic. Two-thirds of the globe is covered by water, 98 percent of which is unsalted brackish water. Only more than 2 percent of the available water resources are freshwater, of which 79 percent is permafrost, 20 percent is groundwater, and 1 percent is lake and river water. Today, there is a shortage of clean drinking water and irrigation of agricultural crops around the world. One of the urgent tasks in agriculture is the efficient use of available water resources and the use of water and resource-saving technologies.

Through the application of new innovative technologies in the irrigation and feeding of cotton with mineral fertilizers in the world cotton, a uniform wetting of the active layer of the soil distributed by the plant root system and increase the fertilizer utilization rate is achieved. When optimal moisture, air, heat and nutrient regime are created in the soil, plant growth and development is accelerated, resulting in a high and quality harvest. Irrigation of cotton by mulching between rows with black polyethylene film and application of mineral fertilizers by water-soluble fertilization are of great practical and theoretical importance.

Today, the cotton industry of the country achieves high results in the system of agro-technologies for the care of cotton through the use of water

and resource-saving technologies in irrigation and feeding with mineral fertilizers. In particular, in recent years, drip irrigation of cotton fields and polyethylene film between rows, with the application of mineral fertilizers dissolved in water and the distribution of irrigation water through artificial flexible pipes to the field, not only save water, but also make efficient use of fertilizers. One of the important tasks in the Action Strategy of the Republic of Uzbekistan for 2017-2021 is "the application of intensive methods in agricultural production, first of all, modern agro-technologies that save water and resources." Therefore, in the effective use of available water resources and mineral fertilizers in cotton, it is important to introduce the method of fertilization of irrigation and feeding mulch between rows of cotton. Resolution of the President of the Republic of Uzbekistan dated April 19, 2013 "On measures to improve the reclamation of irrigated lands and efficient use of water resources for the period 2013-2017" (No. PP-1958) and the Resolution of the President of the Republic of Uzbekistan dated October 25, 2019 No. PP-4499 In accordance with the Resolution of the President of the Republic of Uzbekistan dated June 17, 2019 "On measures to expand the mechanisms for stimulating the introduction of water-saving technologies in agriculture" and the Decree of the President of the Republic of Uzbekistan dated June 17, 2019 "On measures for efficient use of land and water resources" (No. PF-5742) - This dissertation research will serve to implement the tasks set in 2022, the forecast indicators for the introduction of water-saving technologies on 253,381 hectares of arable land, as well as other regulations related to this activity.

The degree to which the problem has been studied. Scientific research on the effectiveness of mulching the soil surface with various organic (straw, sawdust, dry leaves, compost, etc.) and inorganic (polyethylene film of different colors, polycomplexes, volcanic ash, etc.) and feeding plants with mineral fertilizers K.Mirzajanov, M.Mukhamedjanov, I.Turapov, G.Bezborodov, Sh.Kholikulov, O.Yakubjanov, F.Khasanova, B.Niyazaliev, A.Shamsiev, A.Haydarov, A.Sanakulov, L.Mirzaev and foreign in countries by Shogren RL, Duan R., Buser M., Wichman J., Liang Yin-Li, Wu H., Zhu JJ, Singh G., Stkhon HS, Sharma O., and based scientific results have been obtained. However, insufficient research has been done on the application of the fertilization method by mulching cotton between rows with black polyethylene film and dissolving nitrogen fertilizers in water.

The purpose of the study In the conditions of typical irrigated gray soils, cotton is covered with a simple polyethylene film and a black polyethylene film between the rows, improving the agrotechnology of effective use of nitrogen fertilizers in irrigation through flexible pipes and scientifically substantiating the increase of its absorption coefficient.

Tasks of the research consists of:

determination of the mechanical composition of the experimental field soil, the field moisture capacity and the level of nutrient content in the soil;

to determine the effect of irrigation and fertilization feeding of cotton by placing a black polyethylene film between the ordinary field and between the rows, the method of irrigation and fertilization to the agrophysical, water-physical and agrochemical properties of the soil;

to determine the timing, rate and water consumption of cotton in the process of irrigation and fertilization by laying a black polyethylene film between

the ordinary field and between the rows, and to develop the water balance of the field;
to determine the effect of irrigation and fertilization of cotton on the growth and development of the plant and the yield of cotton by placing a black polyethylene film between the ordinary stalks and between the rows;
to determine the effect of feeding on the method of technological quality and cost-effectiveness of the fiber by placing a black polyethylene film between the ordinary stalk and the row, irrigation and fertilization.

The object of research Typical irrigated gray soils, medium-fiber cotton variety “Navruz”, mulching between rows with black polyethylene film, feeding with nitrogen fertilizers dissolved in water by fertilization, methods of water distribution using artificial pipes were obtained.

Subject of research water and resource-saving, environmentally safe range of cotton, mulching irrigation technology, technology of application of fertilization method dissolved in water with nitrogen fertilizers, achieving quality cotton yield, irrigation regime and water consumption of cotton, soil moisture, agrophysical and agrochemical properties of soil.

Research methods. Biometric measurements of plants, soil, plant samples, laboratory analysis, phenological observations on the basis of "Methods of conducting field experiments", "Methods of agrochemical and agrophysical research in polyvnykh khlopkovykh rayonakh polevыkh i vegetatsionnykh opytov s khlopchatnikom" and "Methody opredelen" carried out. The obtained data on cotton yield were analyzed mathematically and statistically using the method of analysis of variance in the manual "Methods of field experiment" by BA Dospekhov and Microsoft Excel.

Scientific novelty of the research consists of:

the effect on the agrochemical, agrophysical and water-physical properties of the soil was first determined by irrigating cotton from a simple field and between rows with a black polyethylene film and fertilizing it with nitrogen fertilizers dissolved in water at different rates;

the optimal duration, number, duration, irrigation and seasonal irrigation norms for cotton are developed when feeding cotton by simple polyethylene film between ordinary rows and between rows, irrigation and fertilization through flexible pipes;

the effect on the growth, development, harvest and cotton yield of cotton was determined by the application of nitrogen fertilizers at different rates by irrigation and flexible pipes lined with ordinary polyethylene film and black polyethylene film between the rows;

The effect of water consumption for the cultivation of one quintal of cotton and the technological quality of the fiber was determined by different methods of irrigation and fertilization by means of flexible pipes lined with a black polyethylene film between the ordinary and the row.

Practical results of the research consists of the following: The practical significance of the results of the study is a new scientific approach to the calculation of the duration, rate, seasonal water consumption, fertility of cotton in the process of global warming. There was a decrease in physical evaporation from the soil surface as a result of mulching between rows, irrigation with flexible pipes, application of nitrogen fertilizers in the method of fertigation.

In typical gray soils, irrigated by simple tillage in options 1,2,4,5 and 7,8, cotton was irrigated 6 times at the rate of 602-980 m3 per hectare during the application period, and the seasonal water norm averaged 4549 m3 per hectare. In options 3.6 and 9, which were irrigated with black polyethylene film between rows, cotton was irrigated 6 times at the rate of 500-590 m3 per hectare during the growing season, with an average consumption of 3317 m3 per hectare during the season or 27.1% water savings compared to the control option.

Compared to option 1, where cotton is traditionally fed at 100% annual rate of nitrogen fertilizers, the method of fertilization with water-soluble fertilization yielded an additional cotton yield of 4.5–8.1 t / ha per hectare, with a net profit of 2,136,550 soums / ha. the rate of return was found to be 8.8 percent higher than the control option.

At the same time, the water used for 1 ts yield was 138.9 m3 per hectare in the 1st variant, and in the 2nd variant, which was dissolved in 100% water with nitrogen fertilizers, this figure averaged 128.2 m3 / ha. Nitrogen fertilizers were applied in 100% of the water-soluble form along with irrigation in film-covered areas, and in option 3 it was only 72.6 m3 / ha.

Reliability of research results. Variation-statistical processing of the results obtained using the methods of field and laboratory experiments, the compatibility of theoretical and practical results, approbation of research results by experts in the years of research, comparison of experimental data with local and foreign research data, research The reliability of the results is reflected in the widespread introduction of the results into production, presentations at national and international scientific conferences, as well as the publication of scientific articles in scientific publications recommended by the Higher Attestation Commission under the Cabinet of Ministers of the Republic of Uzbekistan.

Scientific and practical significance of research results. The scientific significance of the results of the study is that in the conditions of typical irrigated gray soils cotton is covered with a simple polyethylene and black polyethylene film between the rows, irrigation through flexible pipes and application of nitrogen fertilizers in different rates of fertility. This is explained by the fact that the technological quality and the effect of water consumption for the cultivation of one quintal of cotton was studied.

The practical significance of the results of the research is to achieve high yields of high-quality cotton due to the introduction of efficient resource-saving agrotechnology of cotton using simple polyethylene and black polyethylene film between the rows, irrigation through flexible pipes and nitrogen fertilizers.

Implementation of research results. Based on the results of research on the development of water and resource-saving technologies for irrigation and feeding of cotton:

Technology of full application of nitrogen fertilizers in water by dissolving nitrogen fertilizers in water between rows of cotton in Piskent district of Tashkent region 12 hectares in “Isfandiyor” LLC, 16 hectares in “Muhammadali agro business” farm, 13 hectares in “Khasanov Abdumutal” farm, 13 hectares in Bikar farm Introduced on 14 hectares in the farm "Amirshukur Shukurzarif", 13 hectares in the farm "Abdurafe Rajabzoda",

18 hectares in the farm "Maruf Sarvar" (reference of the Ministry of Agriculture dated October 11, 2019 No 02 / 020-3015). As a result, with the use of nitrogen fertilizers in the fertigation method, along with irrigation with a black polyethylene film between the rows of cotton, an additional 2.8–3.3 quintals of cotton was obtained per hectare, irrigation water was saved by 25–28%, yield was 23–25%;

Agrotechnologies for mulching the soil with black polyethylene film and water-soluble nitrogen fertilizers in the care of medium-fiber cotton variety “Navruz” were introduced on the central experimental plot of PSUEAITI on an area of 3 hectares (Reference No. 02 / 020-3015 of the Ministry of Agriculture dated October 11, 2019). As a result, 3.2-6.4 quintals of additional cotton were harvested per hectare, irrigation water consumption was saved by 26.5%, and yields were 28-30%;

Irrigation of cotton by fertilization with nitrogen fertilizers by laying black polyethylene film between rows 30 hectares at PSUEAITI Jizzakh scientific-experimental station in Pakhtakor district of Jizzakh region, 50 hectares at “YaZ Begzod” farm, 42 hectares at “Yoruglik” farm in Zafarabad district ”Was introduced on the farm with an area of 15.5 hectares, a total of 227.1 hectares (reference of the Ministry of Agriculture dated October 11, 2019, No. 02 / 020-3015). As a result, in comparison with the traditional method of application of nitrogen fertilizers, 2.5-4.3 quintals of additional cotton yield per hectare was obtained by fertilization and irrigation of mulched fields, and the yield was 20-25%.

The first chapter of the study, entitled "Review of scientific research on the use of water and resource-saving technologies in cotton," details the results, conclusions and opinions of national and foreign scientists on the subject, the results of research on irrigation technology and soil mulching. and in-depth analysis of local literature. In particular, the results of a study on the effect of water-soluble nitrogen fertilizers on plant growth and yield on the use of flexible pipes for irrigation of cotton in the conditions of typical irrigated gray soils of Tashkent region and the improvement of irrigation with flexible pipes. At the same time, the results of research on the effectiveness of mulching in order to maintain soil fertility and prevent leaching of soil and nutrients are presented. On the last page of the analysis, insufficient research has been conducted on the effect of soil on water, heat and microbiological processes as a result of fertilization of water-soluble nitrogen fertilizers using flexible pipes, mulching cotton rows with black polyethylene film in typical irrigated gray soils of Tashkent region. .

The second chapter of the dissertation, entitled "Assessment of research conditions and methods" describes the soil and climatic conditions of the research site, research methods, experimental system, agro-technical measures. At the same time, the groundwater level of the typical gray soils tested was 18–20 m. described to be around. Preliminary agrochemical data showed that the field soil was low in total humus, nitrate nitrogen and mobile phosphorus, and moderate in exchangeable potassium. Also, the weather data for 2015-2017 provide information on air temperature, precipitation, relative humidity and the sum of useful temperatures during the period (Figure 1-4). Studies have shown that the average rainfall in April was 61.6 and 50.8 mm, which is 27.7 and 40.3 mm less than in the perennials, and the average air temperature in May was + 23.40C and the rainfall was 52.2. mm, which means that the air temperature

was + 0.90C and the amount of precipitation was 14.8 mm more than in many years. In summer, the average temperature is + 26.1–27.2 0S, 0.5–1.9 0S higher than in perennials, with precipitation 0.6 mm higher than the average perennial and 0.3 mm lower in July. , no precipitation was observed at all in August, the sum of useful temperatures was 246 0S, which was 98 0S higher than the perennials, and 59 0S higher in May. In summer, the sum of useful temperatures was 1597 0C. It was noted that the useful temperature was close to each other over the years, so the duration of agro-technical measures applied to crops and the data obtained from them did not differ from each other. The experiment consisted of 9 variants, 3 repetitions, each variant area was 240 m2, and the total calculated land area was 6480 m2. Prospective medium-fiber cotton variety "Navruz" was planted in the study. Pre-irrigation soil moisture was carried out in the order of 70-70-60% relative to ChDNS, experimental phenological observations, soil and plant sampling "Methods of field experiments with cottonseed growing conditions", "Methodology polevыh opyta »,« Methods of Gosudarstvenngo sorta ispytaniya selskoxozyaystvennykh kultur »and« Methods of conducting field experiments ». Humus in soil samples, total and mobile amounts of NPK were carried out in accordance with the instructions "Methods of agrochemical analysis of soil and plants of Central Asia."

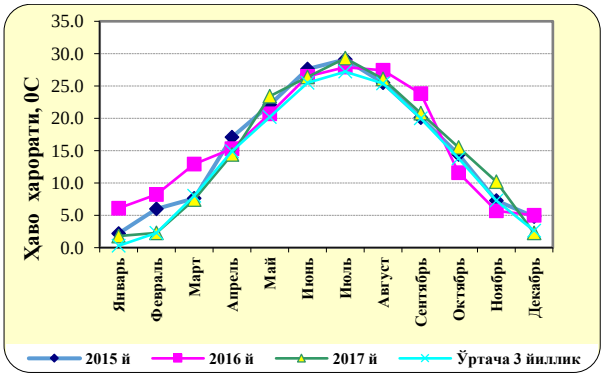

Figure 1 Air temperature, 0S

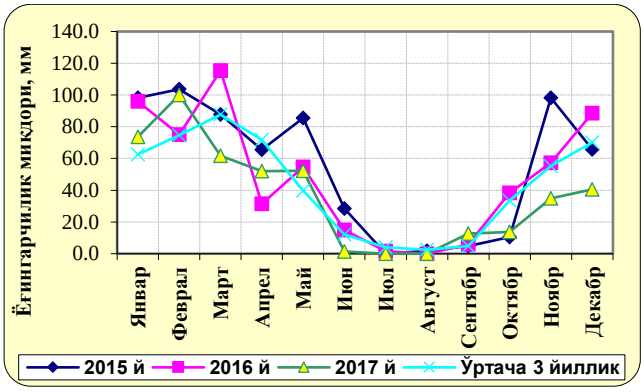

Figure 2 Precipitation, mm

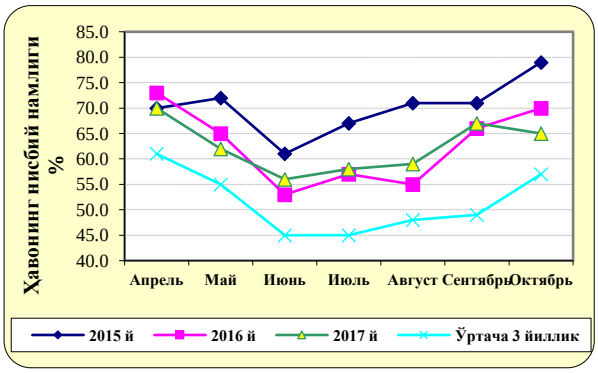

Figure 3 Relative humidity,%

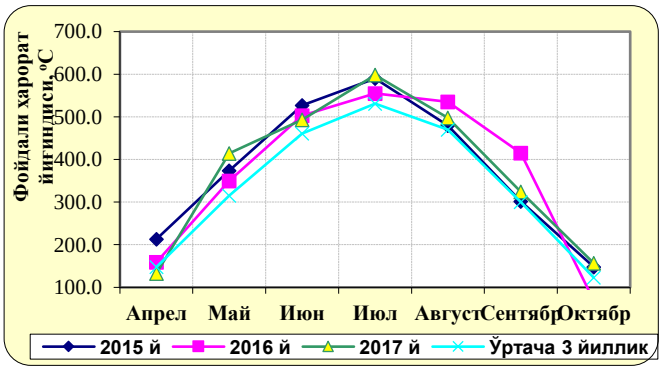

Figure 4 The sum of the useful temperatures, 0S

In the third chapter of the dissertation, entitled "Agrochemical and agrophysical properties of soil in the application of water and resource-saving agro-technologies", the initial agrochemical details of the soil in the 0-30 cm driving layer of soil average 0.829% humus, total nitrogen and phosphorus 0.068-0.091% and nitrate 19.0 mg / kg, the mobile forms of phosphorus and potassium averaged 27.3–277.3 mg / kg. In the 30–50 cm

layer, the average humus content is 0.598%, total nitrogen and phosphorus content is 0.045–0.068%, nitrate content is 10.3 mg / kg, and the mobile forms of phosphorus and potassium are 16.4–163.3. mg / kg, low in humus and nitrate, low in mobile phosphorus, and moderate in exchangeable potassium. From the agro-physical, including water-physical properties of the experimental field soil, studies were conducted on its volumetric mass, porosity, water permeability and field moisture capacity, in which the bulk mass and porosity of the soil in the spring at the beginning of the application period was 1.29 g / cm3. 52.1%, 1.31 g / cm3 in the 0–50 cm layer, 51.4%, and 1.33 g / cm3 and 50.7% in the 0–70 and 0–100 cm layers, respectively. By the end of the growing season, in the 1st variant, where mineral fertilizers were applied in the traditional way, the volume mass of the soil was 0–30 cm in the drive and 1.3–4 and 1.36 g / cm3 in the 0–50 cm layer, the average in the lower 0–70 cm, 0–100 cm layers. 1.38 g / cm3. In variant 2, which was used in combination with irrigation of mineral fertilizers dissolved in water, the volumetric mass of the soil is 1.34 g / cm3 in the 0–30 cm driving layer, and 1.36 g / cm3 in the 0–50 cm layer, the lower 0–70 and 0–100 cm layers averaged 1.37 and 1.38 g / cm3, respectively. When mineral fertilizers are applied in conjunction with irrigation of film-covered areas, the bulk density and porosity of the soil are 1.31 g / cm3 in the 0–30 cm driving layer and 1.33 g / cm3 in the 0–50 cm layer and 50.3% in the lower 0. In the layers -70 and 0–100 cm, the average was 1.35 g / cm3 and 50.0%. It was noted that the optimal values of the volumetric mass of the soil were observed in the variants applied in the form of water-soluble, along with irrigation of mineral fertilizers in the film-lined areas (Fig. 5).

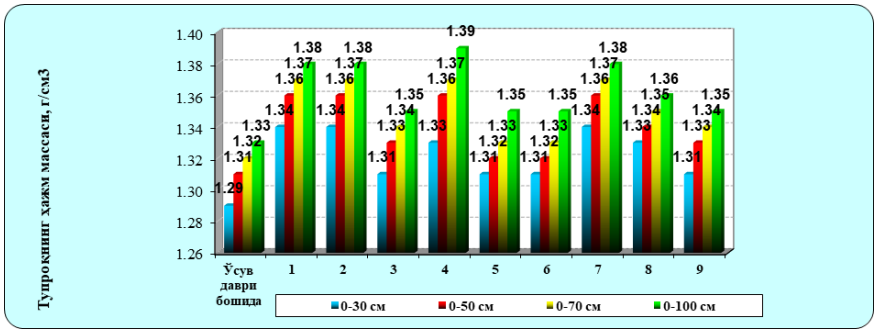

Figure 5 Variation in volumetric mass of experimental field soil, g / cm3

According to the three-year study, annual agro-technical measures, especially when applying nitrogen fertilizers in a fertigation method using flexible polyethylene film between rows of cotton, increased soil volume by 0.03–0.04 g / cm3 at the end of the season. At the beginning of the study period, the porosity of 0–30 and 0–50 cm relative to the soil mass was 52.2, respectively; 51.4; In the 0–70 and 0–100 cm layers, it was 51.1 and 50.7%, respectively (Fig. 6).

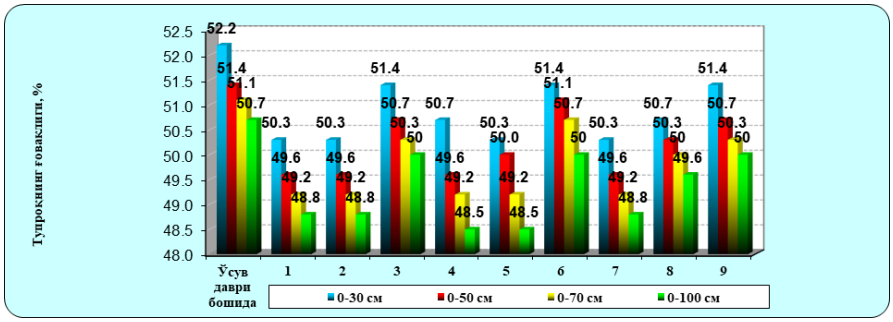

Figure 6 Variation of soil porosity in experimental field,%

The experimental field determined the water permeability of the soil at the beginning and end of the 2015-2017 season, and at the beginning of the 2015 season the soil permeability was 903.6-853.3 m3 / ha in 6 hours at 3 points in the general background. By the end of the application period, it was found that the normal irrigated version was 726.6 m3 / ha, the film permeability was 759.7 m3 / ha, and the water permeability was slightly improved compared to the control option. It was observed that the water permeability of experimental field soil is one of its important water-physical properties, which varies directly from the beginning to the end of the application period, depending on the norms of irrigation water and the number of treatments between rows. As a result of soil compaction as a result of irrigation and inter-row tillage during the growing season, its water permeability was 716.6 m3 / ha for 6 hours in the control option irrigated by ordinary silage and fertilized by sowing method from ordinary silage, fertilized by flexible pipes 4, In 7 variants, a total of 745.2 m3 / ha in 6 hours, irrigated with black polyethylene film, in variants 3, 6 and 9, this figure is 752.1 m3 / ha, respectively, and the water permeability of the soil compared to the control variant 35 , More than 5 m3 / ha. According to the results, in the typical gray soils of Tashkent region in the 1st, 2nd, 4th, 5th and 7th, 8th variants irrigated by ordinary furrow, 602–980 m3 per hectare was irrigated 6 times during the period of operation, the average seasonal water norm was 4549 m3 per hectare. In variants 3, 6 and 9, irrigated with black polyethylene film between rows, cotton was irrigated 6 times at an average rate of 500-590 m3 per hectare during the growing season and the seasonal water norm was 3317 m3 per hectare on average (Table 1). The calculated layer of soil moisture before irrigation was calculated as 70–100–70 cm in accordance with the growth and development phases of cotton in options 1, 2, 4, 5, and 7, 8, and in options 3, 6 and 9, the calculated layer was calculated as 50¬– It was found that in the variants irrigated with a black polyethylene film between the rows of cotton with a layer of 50–50 cm and fertilized with a solution of nitrogen fertilizer in water between rows of cotton, an average of 1232 m3 or 27.1% of irrigation water per hectare of seasonal water norm was saved. Studies have shown that when using the method of mulching between rows with mulch with black polyethylene film, not only the efficiency of mineral fertilizers is increased, but also water savings are achieved. Irrigation of cotton during the growing season with soil moisture in the order of 70–70–60% relative to the CHDNS, except for options 1, 2, 4, 5, 7 and 8, in options 3, 6 and 9, 6 times in the system 1–4–1 during the period of operation as a result, 1232

m3 / ha or 27.1% less water was used per hectare compared to the control option.

Table 1

Irrigation regimes for cotton and seasonal water norms

№	Irrigation regime compared to ChDNS,%	Calculated layer of soil moisture, cm	Seasonal water norm, m3 / ha			Seasonal water norm in 3 years on average, m3 / ha
			2015	2016	2017	
1	70–70–60	70–100–70	4390	4775	4582	4549
2		70–100–70	4390	4775	4582	4549
3		50–50–50	2920	3780	3350	3317
4		70–100–70	4390	4775	4582	4549
5		70–100–70	4390	4775	4582	4549
6		50–50–50	2920	3780	3350	3317
7		70–100–70	4390	4775	4582	4549
8		70–100–70	4390	4775	4582	4549
9		50–50–50	2920	3780	3350	3317

In these variants, the calculated wetting layer is 50–50–50 cm, and irrigation is carried out in small quantities on the calculated layer. Seasonal irrigation water accounted for 51.6-60.4% of the total water consumption of cotton, while the use of soil moisture reserves was 30.1-34.7% and precipitation was 18.2-22.6%. In our study, it was observed that the use of soil moisture reserves is highest in variants 3, 6 and 9, where the calculated soil moisture content is 50–50–50 cm, with a black polyethylene film between the rows of cotton, and nitrogen fertilizers in fertile tubes. Coverage of 1 m3 of irrigation water with cotton yielded an average of 0.62 kg per hectare in the 1st variant of mineral fertilizers applied in the traditional way, and 0.68 kg in the 2nd variant of mineral fertilizers dissolved in water at the rate of 100%. recorded. Mineral fertilizers were found to weigh 1.33 kg in Option 3, which was applied at a 100% rate when dissolved in water along with irrigation in film-lined areas (Table 2). This figure averages 0.63–0.66 kg of mineral fertilizers applied in the traditional way at 75-50% per annum, and in variants 4 and 7, the average weight of mineral fertilizers dissolved in water with irrigation is 75–50% per annum. In the 8th variant, the average weight was 0.66–0.82 kg. It was noted that mineral fertilizers were dissolved in water in the film-lined areas with a solubility of 75–50%, in variants 6, 9, applied at an annual rate of 1.21–1.15 kg. The results showed that the highest values of the water balance of the experimental field were observed in the variants irrigated with black polyethylene film between rows of cotton, in these variants the soil surface film

Table 2

Water consumption of the experimental field (average 2015–2017)

	Experiment options								
	1	2	3	4	5	6	7	8	9

Indicators									
Water supply at the beginning of the operation period, (0–200 cm)	4537	4537	4537	4537	4537	4537	4537	4537	4537
Water supply at the end of the operation period, (0–200 cm)	2974	2989	2952	2982	2975	2994	2940	3094	2981
Use of soil moisture reserve, m3 / ha	1563	1548	1585	1555	1562	1543	1597	1443	1556
Use of soil moisture reserves,%	31,8	31,9	34,7	32,1	32,5	33,9	32,8	30,1	34,3
Seasonal water content, m3 / ha	4075	4075	2980	4075	4075	2980	4075	4075	2980
Seasonal water content,%	59,3	59,5	51,6	59,4	59,5	52,2	59,1	60,4	52,2
Precipitation, m3 / ha	1276	1276	1276	1276	1276	1276	1276	1276	1276
Precipitation,%	18,3	18,4	21,6	18,3	18,3	22,6	18,5	18,2	21,9
Total water used, m3 / ha	6915	6895	5839	6907	6914	5800	6949	6795	5813
Cotton yield, ts / ha	35,8	34,9	38,2	32	32	34,7	29,8	27,6	30,2
The total amount of water used to harvest 1 quintal of cotton, m3	233,1	219,1	144,1	230,2	199,6	151,3	226,4	190,6	163,6
Seasonal amount of water used to harvest 1 quintal of cotton, m3	138,9	128,2	72,6	137,6	127	77,2	137,1	114,6	163,6
Coverage of 1 m3 of irrigation water with the crop, kg	0,88	0,86	1,28	0,79	0,79	1,16	0,73	0,68	1,01

It was observed that the efficiency of irrigation was increased and the water use coefficient was increased due to the prevention of moisture evaporation due to In options 3 and 6 of the experiment, the total amount of water used for 1 quintal of cotton was 72.6 and 77.2 kg / m3, which is 32% less than in the control option. It was found that the total amount of water consumed was 10–19 m3 less than in the case of irrigated cotton with a black polyethylene film between the rows. In general, an increase in irrigation efficiency was observed when cotton was irrigated between rows of rows with black polyethylene film.

In the fourth chapter of the dissertation, entitled "Results of identification of irrigation elements and elements of irrigation techniques", the pre-irrigation soil moisture of cotton differs from the planned order by + -0.5-1.5%. The growth, development and abundant harvest of the plant depend on the

correct timing and norms of irrigation, and it is said that the role of irrigation in the production of high and quality crops from cotton and other agricultural crops is unparalleled. It was noted that delayed and poor quality irrigation in the care of agricultural crops can not only reduce yields, but also negatively affect crop quality, can be achieved only if the soil moisture is moderate, plant growth and improvement of irrigation techniques and technologies. In field experiments, the timing and rate of cotton irrigation were determined by soil moisture, with samples taken from each 0–10 cm layer to 0–100 cm depth before each irrigation, determined using thermostatic scales, and water consumption for each irrigation measured using a 900-degree Thomson water meter. It is stated that During the operation, it was stated that in all irrigation methods of cotton, the pre-irrigation soil moisture was carried out in the order of 70–70–60% relative to the ChDNS.

In the fifth chapter of the dissertation, entitled "Cotton growth, development, harvest and quality indicators of cotton yield", the calculated moisture content layer 50-50-50 cm was obtained by covering the cotton row with a black polyethylene film and fertilizing nitrogen fertilizers using flexible pipes. As a result of irrigation of the 9th option, it was noted that on September 1, the growth and development of cotton was 12-18 cm higher than the control option, and in these variants the rate of opening of the pods was also high, corresponding to 50-55%.

Figure 7 The process of irrigating cotton with flexible pipes.

Figure 8 Irrigate the cotton by mulching with black polyethylene film.

This is an important factor in obtaining high-quality cotton from cotton due to the reduction of the number of inter-row processing of cotton in the variants used in the method of fertigation of nitrogen fertilizers through flexible pipes, laying black polyethylene film between rows, maintaining moisture in the film-lined edges and creating a favorable environment for cotton growth and development. explained that. In scientific research, the highest cotton yield was found in the variants used in the method of fertilization of nitrogen fertilizers by means of flexible tubes, lined with a black polyethylene film between the rows of cotton. In these variants, the cotton yield was 38.1 ts / ha, and in variants 3 and 6, the yield of cotton was 4.5–8.1 ts / ha more than in the irrigated variants of ordinary fields (Table 3). As a result of the research, only irrigation water was saved, which allowed to obtain a high and high-quality cotton crop. At the same time, the

highest fiber consumption in option 3 was 38.3%, and the weight of one thousand seeds was 118.2 grams. compared to other variants, in this variant the fiber yield was 0.6 percent higher and the weight of one thousand seeds was up to 1.0 grams. Studies on the development of the root system of cotton show that the granular properties of the most fertile driving layer of the soil can be improved and favorable conditions for cotton growth and development can be created due to the reduction of the number of inter-row treatments in the options given by the method of fertilization of nitrogen fertilizers in flexible tubes. given In the field experiment, it was observed that the main root is very short and the side roots are highly distributed in the most fertile layer of soil.

Table 3

Impact of cotton irrigation and fertilization with nitrogen fertilizers on cotton yield (2015–2017)

№	Annual rate of nitrogen fertilizers, kg / ha	Calculated layer of soil moisture, cm	Cotton yield by years in experiment, ts / ha				Additional cotton yield, ts / ha	
			2015.	2016	2017	Average	With regard to irrigation methods	In relation to the norm of fertilizer
Application of nitrogen fertilizers in the traditional way								
1	200	70-100-70	35,9	35,8	35,9	35,9	-	**7,7**
4	150	70-100-70	31,0	31,8	32,0	31,6	-	**4,3**
7	100	70-100-70	28,0	28,0	28,7	28,2	-	-
Apply nitrogen fertilizers dissolved in water along with irrigation through a simple furrow								
2	200	70-100-70	33,9	35,8	34,9	34,9	**-1**	**7,9**
5	150	70-100-70	31,5	31,8	32,7	32,0	**-0,4**	**5,0**
8	100	70-100-70	26,4	27,5	27,2	27,0	**-1,2**	-
Application of nitrogen fertilizers in water-soluble form in conjunction with irrigation in film-covered areas								
3	200	50-50-50	39,0	37,8	38,2	38,3	**3,4**	**8,1**
6	150	50-50-50	33,5	34,8	35,7	34,7	**2,7**	**4,5**
9	100	50-50-50	29,6	30,9	30,2	30,2	**3,2**	-
2015 HCP_{05}=1,42 ts / ga; HCP_{05}=2,4%								
2016 HCP_{05}=1,22 ts / ga; HCP_{05}=2,9%								
2017 HCP_{05}=1,45 ts / ga; HCP_{05}=3,8%								

The results of the calculation of economic efficiency are presented in the sixth chapter of the dissertation, entitled "Cost-effectiveness of irrigation and feeding of cotton on the basis of resource-saving technologies and testing of production practices." When calculating the total cost of cotton growing in Option 1, ie mulching between rows of cotton with black polyethylene film increased by 90 thousand soums, but due to the reduction in the number of operations between rows of cotton and the corresponding reduction in fuel and lubricants costs in these options soums / ha. The highest net income was obtained in Option 3 compared to the experimental options, ie black polyethylene film was applied between the rows of cotton and nitrogen fertilizers were applied in flexible tubes by fertilization

method, with a calculated wetting layer of 50–50–50 cm. 30.4–36.9% in variants 1 and 4 irrigated in the normal way, 22.6–23.1% in variants 7 and 8, 45.7% in variant 3, compared to the control variant. profitability was found to be 8.8 percent higher.

In conclusion, the application of nitrogen fertilizers in flexible tubes with a black polyethylene film between the rows of cotton with a calculated moisture content of 50–50–50 cm was achieved with higher efficiency than other experimental options.

Conclusion.

1. At the beginning of the growing season of cotton in the 0–30 cm driving layer of the soil the average content of humus is 0.829%, total nitrogen and phosphorus is 0.068–0.091% and nitrates are 19.0 mg / kg, mobile forms of phosphorus and potassium are 27.3 and 277, 3 mg / kg. In the underlying 30–50 cm layer, these values were found to be 0.598%, 0.045% and 0.068%, respectively, and 10.3 mg / kg, 16.4 and 163.3 mg / kg, respectively. In this study, it was found that the studied soils were poorly supplied with humus, nitrates and mobile phosphorus, and moderately supplied with exchangeable potassium.

2. Irrigation methods have different effects on the volume mass and porosity of the soil, the volume mass and porosity in layers 0–30, 0–50, 0–70, 0–100 cm at the beginning of the application period is 1.29; 1.31; 1.32; 1.33 g / cm3 and 52.2; 51.4; 50.7; 50.3 per cent, respectively, 1.34 in the irrigated variants from ordinary open fields at the end of the period; 1.36; 1.37, 1.38 g / cm3 and 50.7; 50.3; 49.6; At the end of the operation period, the volume density was 0.04–0.05 g / cm3, which was 48.8%. In the experimental variants irrigated with film, the volume mass of the soil in these layers is 1.3–1 in 0–30, 0–50, 0–70, 0–100 cm soil layers, respectively; 1.33; 1.34, 1.35 g / cm3, and the porosity was 51.4, respectively; 50.9; 50.0; At 49.6 percent, these values were found to be improved by 0.3 g / cm3, respectively, compared to control options irrigated by simple open fields. The most optimal indicators of soil volume, mass and porosity were observed in variants using the method of fertilization in the form of water-soluble, along with irrigation of nitrogen fertilizers in the film-lined fields through flexible pipes.

3. In options 1, 2, 4, 5 and 7, 8 irrigated by open fields, cotton was irrigated 6 times in 1–4–1 system during the growing season, the irrigation rate was 595–1010 m3 / ha, and the seasonal irrigation rate was 3950–4200 m3. / ha. In variants 3, 6 and 9, irrigated with black polyethylene film between rows, irrigated 6 times in 1–4–1 system during the period of operation, but the irrigation rate did not exceed 450–750 m3 / ha and seasonal water consumption did not exceed 2920–3317 m3 / ha. 1232 m3 / ha, or 27.1% of water was saved compared to the option.

4. The seasonal water consumption per quintal of cotton was 128.2-138.9 m3 when irrigated with ordinary open fields, and 72.6 m3 in option 3 when 100% of nitrogen fertilizers were dissolved in water for film-coated fields. water was proven to consume 2 times less water.

5. As a result of application of nitrogen fertilizers by fertilization irrigation through flexible pipes by mulching cotton between rows with black polyethylene film, it was determined that cotton grows, develops, yields and has the highest rate. As of September, the number of cocoons in

this experimental variant was 11.1 or 1.7 more than in the control variant, and the opening rate of cocoons was 6.0 or 54.5%, respectively.

6. Annual rates of nitrogen fertilizers irrigated from open fields are 100, 75 and 50% in options 1, 4 and 7 fed in the traditional way (200; 150; 100kg / ha) 35.9; 32.0 and 28.2 ts / ha, 34.9 in variants 2, 5 and 8 fed by the method of fertilization dissolved in water; Cotton yields were achieved at 32.0 and 27.0 ts / ha, respectively, with an additional yield of 5.0-7.9 ts / ha compared to the conventional irrigation method.

7. Between the rows watered with a layer of black polyethylene film, 200 with nitrogen fertilizers; 150; 38.3 in variants 3.6 and 9, fed by fertilization method, dissolved in water at the rate of 100 kg / ha; Cotton yields were 34.7 and 30.2 ts / ha, respectively. The highest cotton yield was observed when irrigated with black polyethylene film between rows and fertilized with pure nitrogen fertilizers at a rate of 200 kg / ha dissolved in water, and an additional cotton yield of 4.5 to 8.1 ts / ha was achieved.

8. In typical irrigated gray soils, the yield rate of cotton compared to conventional irrigated cotton is 36.9% in option 1 with traditional application of nitrogen fertilizers, 37.3% in option 2 with water dissolved in combination with nitrogen fertilizers, the highest among black polyethylene film-mulched and nitrogen fertilizer through flexible tubing fertilization method was 45.7% in option 3 or 8.8% higher than in the control option.

9. Improved method of growing high-quality cotton from medium-fiber cotton varieties in typical gray soils of Tashkent region, ie application of 100% of the annual norm of nitrogen fertilizers (200 kg / ha) in water-soluble fertilization through flexible pipes, 70% of phosphorus fertilizers and Apply 50% of potassium fertilizers under plowing, the rest before mulching with film, with the norm of irrigation 450–750 m3 / ha, the norm of seasonal irrigation 2660–3300 m3 / ha, taking into account the calculated layers of soil moisture in phases during the period of application 50–50–50 cm / ha It is recommended to irrigate a total of 6 times in 1–4–1 system.