

**Optimum Irrigation Method Of Winter Wheat Varieties Grown In The Conditions Of Meadow Soils Of Andijan Region, Influence Of Optimal Irrigation Method On Crop Elements And Productivity**

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**Abstract.** Irrigation soil moisture of winter wheat varieties "Tanya", "Vershina", "Kalym", "Andijan-4" in conditions of meadow soils of Andijan region compared to limited field moisture capacity (ChDNS) 70-70-70%, 75-75-75% and maintained at 80-80-80%. Irrigation soil moisture relative to limited field moisture capacity (ChDNS) 75-75-75% in the specified variants of the above varieties of winter wheat compared to other irrigation options (ChDNS 70-70-70%, 80- 80-80%) formation of high yield elements was determined. Among the studied varieties of winter wheat, the "Kalym" variety, which belongs to foreign varieties, is considered acceptable ChDNS 75-75-75% irrigation option spike length (cm), number of grains in one ear (grains), weight of grains in one ear (g), weight of 1000 grains (g) showed high results and was found to be 8.8 cm, 45.8 pieces, 1.46 g, 42.4 g, respectively. When analyzing the grain and straw yield of winter wheat depending on the irrigation methods, the "Vershina" variety belonging to foreign varieties has the highest grain yield of 69.5 t/ha, soil moisture before irrigation is 80-80-80% in the irrigation option of 82.4 ts/ha was determined to form a straw crop.

**Key words.** Meadow soil, winter wheat, varieties of winter wheat "Tanya", "Vershina", "Kalym", "Andijan-4", soil moisture before irrigation, relative to limited field moisture capacity (ChDNS), yield elements of winter

wheat, spike length, a number of grains per ear, weight of grains per ear, weight of 1000 grains, grain and straw yield.

**Introduction.** Humanity's demand for agricultural crops has increased year by year in the current and historical development periods. Among these agricultural crops, we can see that wheat crop has always occupied a high place in terms of its importance.

Along with the growing importance of wheat cultivation, the amount of grain products grown per unit area increased from year to year. It has been determined by many scientists that the agrotechnical measures used during the development period of winter wheat, taking into account the demand of the crop for this agrotechnical measure, the correct determination of its duration, rate, and quality, and its implementation, will definitely have a positive effect on the quantity and quality of the products obtained from this crop. At the same time, the scientific research conducted on the wheat crop retains its importance in the conditions of today's global climate change.

Irrigation, which is considered an important agricultural activity in winter wheat care, should be carried out on a scientific basis. Because, as a result of irrigation works performed in the right time and at the right rates, not only the crop yield is guaranteed, but also serves to improve the parameters of the soil, which are important in the process of crop cultivation.

The level of study of the problem.

In many scientific researches, it has been determined that for the optimal growth and development of winter wheat varieties and the formation of high and quality grain crops, irrigation should be carried out when the soil moisture before irrigation is 70-75 compared to ChDNS. [1,2,3].

By B.Komilov, N.Ibragimov, T.Rajabov for high yield (43.9-44.9 t/ha) of winter wheat variety "Ulug'bek-600" while keeping the soil moisture level at 70-80-70% during the operation period. It is emphasized that it is advisable to

water 5 times with the 1-3-1 system and spend 2930-3010 cubic meters of water per hectare. [4]

Soil moisture is one of the factors affecting the yield of winter wheat for agricultural crops, especially under irrigated farming conditions. When there is enough (acceptable) moisture in the soil, the grain can withstand even 45°C heat. At 50°C, it starts to dry after 30 minutes. According to the scientists, each variety should have suitable soil and climate conditions, different feeding standards, and watering procedures. Q.M.Mirzajonov. [5]

According to the research conducted by O.Mirzaev, B.Azizov and Z.Jumaboev of the educational-scientific production farm of the Andijan Agricultural Institute in the conditions of meadow-swamp soil, seepage water at a depth of 1.2-1.7 meters from the ground level, the following varieties of winter wheat soil moisture is 70-70-60% relative to field moisture capacity, mineral fertilizers N<sub>200</sub> P<sub>150</sub> and K<sub>120</sub> kg/ha are given, Sangzor 8-78.0 ts/ha, Sangzor - 4 - 67.7 ts/ha, Qayroqi bug'doy – 45.1 ts /ha. Kroshka -84.0 t/ha, Ummanka- 86.3 t/ha, Dimetra - 76.0 t/ha, Yuna - 77.3 t/ha, Knyajna - 82.6 t/ha grain yield was obtained. [6]

Alisashov said that the study of irrigation procedures in winter wheat agrotechnics is of great importance. Because the efficiency of the applied mineral fertilizers depends on the optimal soil moisture. Based on this, in 2002-2003, experiments were conducted in the educational and scientific production farm of the Andijan Agricultural Institute to determine the feeding rate and irrigation procedure of the winter wheat variety "Chillaki". According to him, the highest productivity was achieved when the feeding rate was N<sub>180</sub>, P<sub>120</sub>, and K<sub>60</sub> kg/kg, and soil moisture before irrigation was 70-70-70% compared to ChDNS. [7].

During the growing season, winter wheat consumes 5153-6487 m<sup>3</sup> of water per hectare, depending on the irrigation regime. 40-55% of it is due to irrigation. The rest is covered by precipitation and soil moisture. These

indicators vary depending on irrigation, fertilizers, planting time, varieties, and soil conditions. R.O.Oripov, N.Kh.Khalilov. [8].

According to the results of the experiment conducted by P.Kh.Bobomirzaev in the conditions of Kashkadarya region, which is part of the southern region of our republic, moisture-accumulating irrigation creates favorable conditions for rapid and rapid germination of seeds and good development in autumn. In non-irrigated plots (control), most of them accumulate in spring when there is no atmospheric precipitation in autumn. Sufficient stem formation was observed when soil moisture content was 70 and 80% relative to ChDNS. When the spring arrives, in non-irrigated plants, rooting usually stops due to lack of moisture, the secondary root system is weakly developed, while the irrigated plants grow well and form many stems in the spring, and they can be preserved until the end of the growing season, but they have a low rooting compared to autumn rooting. [9].

During winter wheat tuber formation, productive stalks, spikes within the stalks, and grains in the spike are formed. The duration of the tuber period is 25-30 days. During this period, the plant collects 50-60 percent of the dry matter that it collects during the entire vegetation period. Lack of moisture and nutrients during the tuber period has a negative effect on productivity. Fertilized areas are irrigated at the rate of 600-700 m<sup>3</sup>/ha based on the conditions of each region, taking into account the soil and climate conditions. Irrigation by juice method gives good results. R.Siddikov, N.Yusupov [10].

According to the results obtained from the researches of S.O.Abdurakhmonov, I.I.Abdullaev, Y.E.Khurmatov, soil moisture before irrigation is 70-80-70% compared to ChDNS, and when 3000-4500 kg of bentonite per hectare is used in addition to mineral fertilizers, winter wheat "Moskvich" variety (58.6 tons/ha) obtained a high grain yield. [11].

Applying 3000-4500 kg of bentonite slurry per hectare to winter wheat in the conditions of typical gray soils of Tashkent region allows to save up to 850 m<sup>3</sup> of water per hectare. S.O.Abdurakhmanov, I.I.Abdullaev [12].

I.N.Khoshimov, A.Dekhkanovlar studied the method of using local fertilizers to obtain high and quality grain yield from winter wheat varieties "Sanzar-8", "Ulug'bek-600" in the conditions of typical gray soils affected by irrigation erosion. According to the data obtained in the experiment, when 30 t/ha of manure is sprinkled on the surface of the soil and 200 kg of nitrogen, 150 kg of phosphorus and 100 kg of potassium are applied per hectare during the wheat growing season, the yield of "Sanzar-8" variety is 26.6 t/ha, 37.6 t/ha straw, and "Ulug'bek-600" yielded 31.3 t/ha of grain and 38.3 t/ha of straw. [13].

### **Research conditions and methods.**

Our scientific research on the topic "Study of the optimal irrigation procedure for new varieties of winter wheat in the grassland soils of Andijan region" was carried out in the conditions of the grassland soils of the Izboskan Izboskan district of Andijan region during the years 2017-2020. production experiments were carried out in conditions of meadow soils of farms in this district.

Tanya, Vershina, Kalym, Andijon-4 varieties of winter wheat were planted to study the issues raised on the topic of the dissertation.

In the research, observation, measurement and analysis were carried out on out on the basis of "Methods of conducting field experiments" (2007) [14], and and agrotechnical activities were carried out in the order adopted by the farm. Soil farm. Soil moisture before irrigation was carried out in the order of 70-70-70%, 75-70%, 75-75-75%, 80-80-80% in relation to ChDNS. Soil moisture measurements measurements were taken from 0-50 cm before tillering, 0-70 cm from tillering and 0-50 cm from tillering. Our Our field experiments were placed in 4 rows on one level, and research work was was carried out. The length of the fence is 50 m, 16 rows, the distance between between fences is 60 cm, the 8 rows in the middle of the 16 rows are calculation calculation rows, and the four 4+4=8, 4+4=8 rows on both sides are protection protection rows.

### **Research results.**

In the autumn wheat care of 2017-2020, soil moisture before irrigation was set at 70-70-70%, and irrigations were carried out 3 times in the 1-1-1 system. The irrigation rate of winter wheat was 552 m<sup>3</sup>/ha before the tuber period, 747 m<sup>3</sup>/ha before earing, 553 m<sup>3</sup>/ha before ripening, seasonal irrigation rate was 1852 m<sup>3</sup>/ha, and the average irrigation rate was 618 m<sup>3</sup>/ha. Irrigation was carried out 4 times in the 1-2-1 system, with soil moisture before irrigation set at 75-75-75%. For winter wheat, 463 m<sup>3</sup>/ha before tuber period, 1260 m<sup>3</sup>/ha before earing, 464 m<sup>3</sup>/ha before

ripening, seasonal irrigation rate was 2187 m<sup>3</sup>/ha, average irrigation rate was 547 m<sup>3</sup>/ha. Irrigations were carried out 5 times in the 1-3-1 system, with soil moisture before irrigation set at 80-80-80%. Winter wheat was 354 m<sup>3</sup>/ha before the tuber period, 1534 m<sup>3</sup>/ha before earing, 365 m<sup>3</sup>/ha before ripening, and the seasonal irrigation rate was 2253 m<sup>3</sup>/ha, and the average irrigation rate was 451 m<sup>3</sup>/ha.

It should be noted that with the increase of pre-irrigation soil moisture of winter wheat, the seasonal irrigation rates increased, but once it was found that the irrigation rate decreased.

The results of observations on the growth and development of winter wheat varieties depending on the irrigation regime are shown in Figure 1, the average results for years.

*Table 1*

**2017-2020 Irrigation periods, number, system, duration, one-time and seasonal irrigation norms of winter wheat varieties, 2017-2020**

Pre-irrigation soil moisture % in relation to ChDNS	Years	Irrigation system	Irrigation rate, m <sup>3</sup> /ha			Seasonal irrigation rate, m <sup>3</sup> /ha	3-year average irrigation rate, m <sup>3</sup> /ha
			Up to piping	Until the spike	Until ripe		
70-70-70	2018	1-1-1	551	741	551	1844	1852
	2019	1-1-1	545	741	542	1829	
	2020	1-1-1	559	759	564	1882	
	Average	1-1-1	552	747	553	1852	
75-75-75	2018	1-2-1	464	1249	462	2175	2187
	2019	1-2-1	459	1261	467	2186	
	2020	1-2-1	466	1271	464	2200	
	Average	1-2-1	463	1260	464	2187	

80-80-80	2018	1-3-1	358	1532	358	2247	2253
	2019	1-3-1	352	1495	362	2209	
	2020	1-3-1	351	1576	377	2303	
	Average	1-3-1	354	1534	365	2253	

According to the results (average of 3 years) obtained on the change of crop structure depending on irrigation procedures, in the years of the study, the soil moisture before irrigation was at the level of 70-70-70 percent compared to ChDNS, in the first option, the Tanya variety of winter wheat had a spike length of 7.1 cm, one spike grains are 39.8 grains, the weight of grains in one ear is 1.36 g, the weight of 1000 grains is 37.3 g, in the second option, when the moisture content of the soil before irrigation is at the level of 75-75-75 percent in relation to ChDNS, the length of the ear is 8.3 cm, one 42.1 grains in a spike, 1.42 g of grains in one spike, 1000 grains weigh 38.2 g, in the third option, when the moisture content of the soil before irrigation is 80-80-80 percent compared to ChDNS, the length of the spike is 8.2 cm, it was observed that the grains in one ear were 40.4 grains, the weight of grains in one ear was 1.36 g, and the weight of 1000 grains was 35.3 g.

In the first option, when the moisture content of the soil before irrigation is at the level of 70-70-70 percent compared to ChDNS, the Vershina variety of winter wheat has an ear length of 7.6 cm, grains in one ear are 41.5 grains, weight of grains in one ear is 1.45 g, weight of 1000 grains is 40,8 g, in the second option, where the moisture content of the soil before irrigation is 75-75-75 percent compared to ChDNS, the length of the spike is 8.7 cm, the grains in one spike are 45.2 grains, the weight of grains in one spike is 1.47 g, the weight of 1000 grains 42.2 g, in the third option, where the moisture content of the soil before irrigation is 80-80-80 percent compared to ChDNS, the length of the spike is 7.8 cm, the grains in one spike are 44.1 grains, the weight of grains in one spike is 1.45 g, 1000 grains it was observed that the weight was 39.1 g.



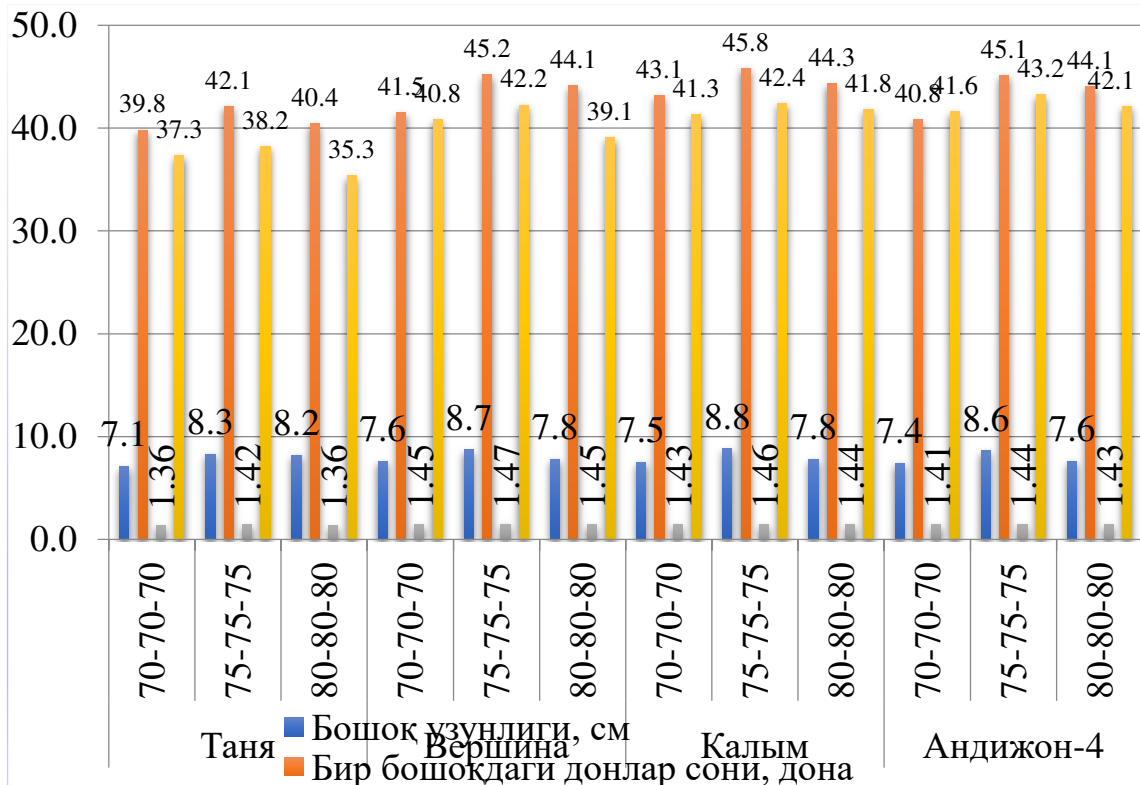


Figure 1. Changes in the yield structure of winter wheat varieties depending on irrigation regimes. 2017-2020 average

In the first option, when the soil moisture before irrigation is at the level of 70-70-70 percent in relation to ChDNS, the Kalym variety of winter wheat has an ear length of 7.5 cm, grains in one ear are 43.1 grains, weight of grains in one ear is 1.43 g, weight of 1000 grains is 41.3 g, in the second option, where the moisture content of the soil before irrigation is 75-75-75 percent compared to ChDNS, the length of the spike is 8.8 cm, the grains in one spike are 45.8 grains, the weight of grains in one spike is 1.46 g, the weight of 1000 grains 42.4 g, in the third option, where the moisture content of the soil before irrigation is 80-80-80 percent compared to ChDNS, the length of the spike is 7.8 cm, the grains in one spike are 44.3 grains, the weight of grains in one spike is 1.44 g, 1000 grains it was observed that the weight was 41.8 g.

In the first option, when the moisture content of the soil before irrigation is at the level of 70-70-70 percent compared to ChDNS, the

Andijan-4 variety of winter wheat, the length of the ear is 7.4 cm, the grains in one ear are 40.8 grains, the weight of grains in one ear is 1.41 g, 1000 grains weight 41.6 g, in the second option, where the moisture content of the soil before irrigation is 75-75-75 percent compared to ChDNS, the length of the spike is 8.6 cm, the grains in one spike are 45.1 grains, the weight of grains in one spike is 1.44 g, 1000 grains weight 43.2 g, in the third option, where the moisture content of the soil before irrigation is 80-80-80 percent compared to ChDNS, the spike length is 7.6 cm, the grains in one spike are 44.1 grains, the weight of grains in one spike is 1.43 g, 1000 grains it was observed that the weight was 42.1 g.

In conclusion, it should be said that the influence of irrigation methods on the productivity of winter wheat varieties was studied, and the highest productivity indicators of winter wheat varieties were obtained when the pre-irrigation soil moisture was at the level of 75-75-75 percent compared to ChDNS.

Soil moisture is considered to be the main factor affecting the quantity and quality of yield in agriculture, especially in irrigated farming conditions. In our conducted field experiments, grain and straw yield of winter wheat varieties cultivated under different irrigation regimes was studied. The average results obtained in the years of our field experiments are presented in Figure 2.

According to the results (3-year average) of changes in grain yield depending on irrigation methods, in the years of the study, soil moisture before irrigation was at the level of 70-70-70 percent of ChDNS in the first option, from Tanya variety of winter wheat in 2017, 2018 and 2019, respectively. 59.4, 61.3, 61.9 ts/ha, soil moisture before irrigation is 75-75-75 percent compared to ChDNS in the second option, 65.3, 65.3, 67.4 ts/ha, soil before irrigation 62.9, 60.2, 63.2 ts/ha grain yield was obtained in the third variant with moisture content of 80-80-80 percent compared to ChDNS.

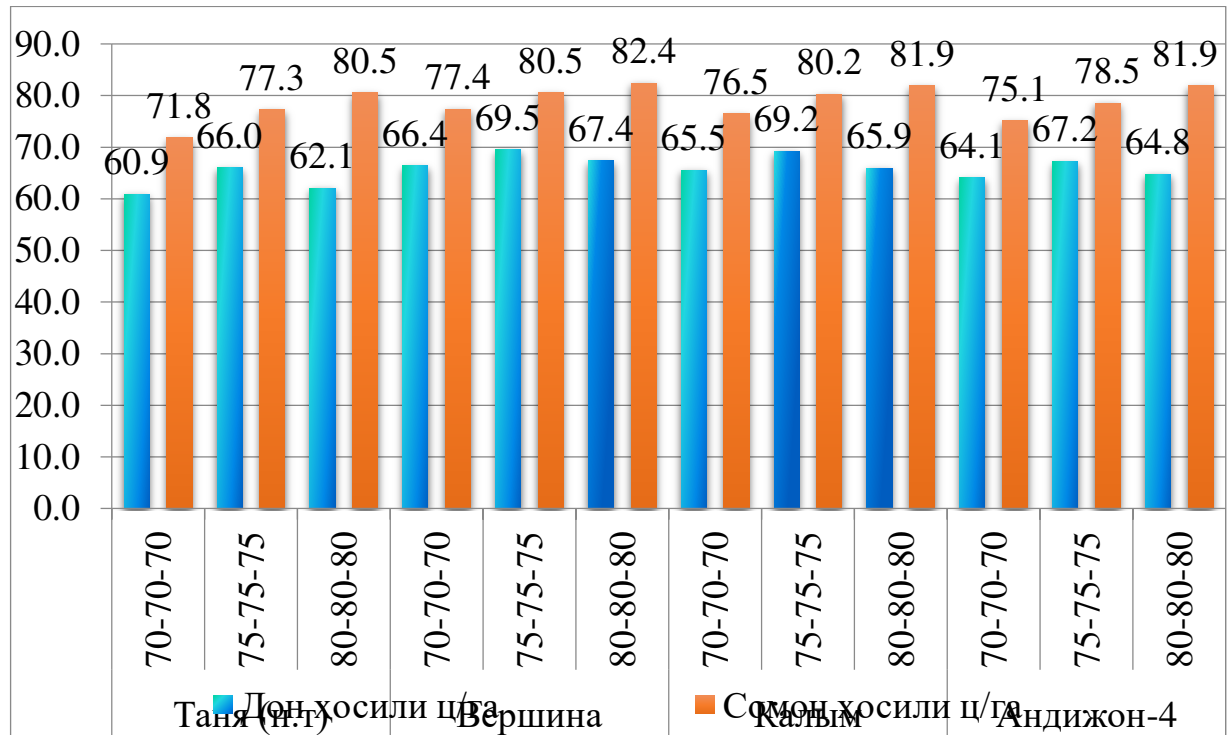
In the first option, where the pre-irrigation soil moisture is at the level of 70-70-70 percent compared to ChDNS, the Vershina variety of winter wheat was

66.0, 65.6, 67.6 t/ha in 2017, 2018 and 2019, respectively, and the pre-irrigation soil moisture ChDNS 69.0, 69.1, 70.5 ts/ha in the second option at the level of 75-75-75 percent, in the third option with the pre-irrigation soil moisture at the level of 80-80-80 percent compared to ChDNS 67.5, 66, 6, 68.1 tons/ha grain yield was obtained.

In the first option, where the pre-irrigation soil moisture is at the level of 70-70-70 percent compared to ChDNS, the Kalym variety of winter wheat was 65.3, 64.9, 66.4 t/ha in 2017, 2018 and 2019, respectively, and the pre-irrigation soil moisture ChDNS 69.1, 68.7, 69.9 ts/ha in the second option at the level of 75-75-75 percent, in the third option where the soil moisture before irrigation is at the level of 80-80-80 percent compared to ChDNS 66.4, 65, 4, 66.0 tons/ha of grain yield was obtained.

In the first option, where the pre-irrigation soil moisture is at the level of 70-70-70 percent compared to ChDNS, the winter wheat Andijan-4 variety was 64.2, 63.1, 65.0 t/ha in 2017, 2018 and 2019, respectively. 67.4, 66.3, 68.0 ts/ha in the second option with humidity at the level of 75-75-75 percent compared to ChDNS, 64.1 in the third option with soil moisture before irrigation at the level of 80-80-80 percent compared to ChDNS, 65.5, 64.8 t/ha grain yield was obtained.

The highest grain yield of all varieties of winter wheat studied in the experiments was obtained in the second option, where the pre-irrigation soil moisture was at the level of 75-75-75 percent compared to ChDNS. So, for the good growth and harvest of winter wheat in the meadow soils of Andijan region, soil moisture before irrigation should be 75-75-75 percent.



0.23 t/ha for NSR<sub>05</sub> varieties, 1.17 t/ha for NSR<sub>05</sub> irrigation regimes.

Figure 5.6. Grain and straw yield of winter wheat cultivars as a function of irrigation regimes. 2017-2020, average. ts/ha

The highest grain yield of all varieties of winter wheat studied in the experiments was obtained in the second option, where the pre-irrigation soil moisture was at the level of 75-75-75 percent compared to ChDNS. So, for the good growth and harvest of winter wheat in the meadow soils of Andijan region, soil moisture before irrigation should be 75-75-75 percent.

Straw harvest of winter wheat varieties is still important in agriculture, especially in animal husbandry. In our conducted experiments, it was observed that the effect of winter wheat irrigation on straw yield was significant.

According to the results obtained on changes in straw yield depending on irrigation methods (average of 3 years), in the years of the study, the soil moisture before irrigation was at the level of 70-70-70 percent according to ChDNS, in the first option, from Tanya variety of winter wheat in 2017, 2018 and 2019, respectively. 70.4, 72.2, 72.9 ts/ha, 76.6, 76.6, 78.6 ts/ha; in the third variant, with

a moisture level of 80-80-80 percent compared to ChDNS, 81.3, 78.6, 81.7 tons/ha of straw yield was obtained.

In the first option, where the pre-irrigation soil moisture is 70-70-70 percent compared to ChDNS, the Vershina variety of winter wheat in 2017, 2018 and 2019 was 76.9, 76.6, 78.5 t/ha, respectively, and the irrigation soil moisture to ChDNS 80.0, 80.1, 81.4 ts/ha in the second option at the level of 75-75-75 percent, in the third option at the level of 80-80-80 percent relative to ChDNS, soil moisture before irrigation is 82.4, 81.6, 83.1 tons/ha of straw yield was obtained.

In the first option, where the pre-irrigation soil moisture is at the level of 70-70-70 percent compared to ChDNS, the Kalym variety of winter wheat in 2017, 2018 and 2019 was 76.3, 75.9, 77.3 t/ha, respectively, the pre-irrigation soil moisture ChDNS 80.0, 79.7, 80.9 ts/ha in the second option at the level of 75-75-75 percent, in the third option where the soil moisture before irrigation is at the level of 80-80-80 percent compared to ChDNS 82.3, 81, 3, 81.9 tons/ha of straw yield was obtained.

In the first option, where the pre-irrigation soil moisture is at the level of 70-70-70 percent compared to ChDNS, the winter wheat Andijan-4 variety was 75.2, 74.1, 75.9 t/ha in 2017, 2018 and 2019, respectively, before irrigation 78.7, 77.6, 79.2 ts/ha in the second option with humidity at the level of 75-75-75 percent compared to ChDNS, 81.1 in the third option with soil moisture before irrigation at the level of 80-80-80 percent compared to ChDNS, 82.5, 81.9 tons/ha of straw yield was obtained.

The highest amount of straw yield obtained from all varieties of winter wheat studied in the experiments was obtained in the third option, where the pre-irrigation soil moisture was at the level of 80-80-80 percent in relation to ChDNS.

### **Conclusion.**

1. It was found that with the increase of pre-irrigation soil moisture in winter wheat from 70-70-70% to 75-75-75% and 80-80-80%, the irrigation rate decreases, and the seasonal irrigation rate increases. Irrigation systems in wheat fields are 1-1-1 in wheat at pre-irrigation soil moisture; He formed 1-2-1 and 1-3-1. The seasonal irrigation rate in wheat is 1852 m<sup>3</sup>/ha when the pre-irrigation soil moisture is 70-70-70% relative to ChDNS (3-year average), 2187 m<sup>3</sup>/ha when it is 75-75-75%, and 2253 m<sup>3</sup>/ha when it is 80-80-80%. It was found that it constituted ga.

2. It was observed that the pre-irrigation soil moisture in winter wheat is 75-75-75% in relation to ChDNS, which is optimal for the formation of crop elements. In winter wheat, compared to the control Tanya variety, spike length, number of grains in one spike, weight of grains in one spike, weight of 1000 grains are observed in winter wheat. 0.5 cm, 3.1 units, 0.05 g, 4.0 g in the Vershina variety, 0.5 cm, 3.7 units, 0.04 g, 4.2 g in the Kalym variety, Andijon- It was found that in 4 varieties it was higher by 0.3 cm, 3.0 pieces, 0.02 g, 1.1 g.

3. Soil moisture before irrigation in winter wheat compared to ChDNS of winter wheat 75-75-75 winter wheat control variety Tanya yielded an average of 66.0 t/ha and Vershina variety compared to control 3.5 t/ha, Kalym variety 3.2 t/ha ha, an additional grain yield of 1.2 tons/ha was achieved from the Andijon-4 variety.

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