

## Water-Saving Technology in Sandy Soil Conditions

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### Abstract:

The article describes the possibilities of improving the moisture regime of the soil and reducing water consumption by co-planting crops (joint care) in the conditions of sandy soils of the desert region.

**Keywords:** Co-planting, soil moisture, irrigation rate, water consumption.

### Introduction

Desert sand and sandy soils are the most common types of soils, the area of which is 64.7 million hectares in the CIS countries and 13.8 million hectares in Uzbekistan.

Out of this, only in the Republic of Uzbekistan, 1572 thousand hectares are irrigated.

The mechanical composition of sandy soils is light, the amount of sand particles (0.25-0.05 mm) in 1 m of soil layer is >75%, and the amount of physical clay is 10.4-21.3%. Also, the amount of humus is very low (0.2-0.5%), the volume weight is from 1.40-1.47 g/cm<sup>3</sup>, the specific gravity is from 2.64-2.68 g/cm<sup>3</sup>, the porosity is 45.1 consists of - 47.0%.

Because of this, soil water physical properties are bad (water permeability 11758-15350 m<sup>3</sup>/ha, limited field moisture capacity 7.8-9.5%) [3] a large number of irrigations are needed in the maintenance of agricultural crops. In this case, a part of the water is inefficiently lost due to seepage into the lower layers, which cannot be assimilated by the plants, up to seepage water, and another part due to the high evaporation characteristic of this region.

After all, in the conditions of the sandy soil of the desert region, achieving efficient use of water and saving water is of great scientific and practical importance.

The purpose of the study. It consists in achieving efficient use of water in irrigation and reducing water consumption by planting crops in sandy soils.

Research object and subject. The sandy soils of the desert region, cotton, soybean and peanut crops are the object of research. Soil moisture regime, crop water demand and water consumption were studied in the methods of sowing cotton with soybean and peanut in sequence (mixed) in all rows and alternately in separate rows under sandy soil conditions. .

Method of conducting research. Field experiments were carried out on the basis of methodological manuals "Metodika polevyx opytov s xlopchatnikom", laboratory analyzes "Metody agrokhimicheskikh, agrofizicheskix, microbiologicheskikh issledovaniy v polivnyx xlopkovyx rayonakh".

Crop water demand was determined by cell sap concentration using a hand-held reflectometer.



Research conditions. Field studies were conducted in the conditions of sandy soils distributed in the Central Fergana desert region of Uzbekistan. The water level of Sizot is 2.2-2.4 meters.

The mechanical composition of the soil of the experimental field is light (sand particles >75%, physical turbidity <10%), low productivity (humus content 0.467-0.553%, total nitrogen 0.048-0.056% and total phosphorus 0.040-0.046%), excellent water-physical properties. poor (limited field moisture capacity 7.8-9.6%, water permeability 11458-12350 m<sup>3</sup>/ha, capillarity 44-48 cm) and is extremely unfavorable for the maintenance of agricultural crops.

Research results. In our experiments, when cotton is planted together with soybeans and peanuts, the soil surface is fully covered with plants and better shaded, as well as soil moisture is preserved more and longer due to the enrichment of the soil with plant residues.

This was especially evident after the 2nd irrigation, when the air temperature rose to a high level and the crops completely covered the soil surface.

In particular, when cotton is cultivated without partner crops, the average moisture content of the soil layer (0-30 cm) is 9.0 on the 3rd day of irrigation; 7.1% on the 6th day and 6.0% on the 9th day, 9.2% when the cotton was planted in the row with the soybean crop. 7.6 and 6.5%, and 9.2 when cotton and soybean crops are planted alternately in separate rows; It was 7.2 and 6.3% .

9.4 when crops are planted in a row in a row, with better moisture retention when cotton is planted with peanuts; 7.7 and 6.6%, and 9.3 when planted alternately in separate rows; It consisted of 7.5 and 6.4% (Figure 2).

These amounts of soil moisture are higher than in the previous (2018) research year, which is explained by the enrichment of the soil with plant residues.

In the conditions of co-planting of crops, more and longer preservation of moisture in the soil ensured that irrigation periods were extended from 12-14 days to 14-16 days.

As a result, it is permissible to irrigate 6 times in the 1-4-1 system in the control option where cotton is planted without partner crops, and 5 times in the 1-3-1 system when cotton is planted in partnership with soybean and peanut crops.

When cotton was planted without companion crops, irrigation standards were 719-743 m<sup>3</sup>/ha, seasonal water consumption was 4370 m<sup>3</sup>/ha, while cotton was planted with soybeans and peanuts, irrigation standards were 712-739, seasonal water consumption was 3624 m<sup>3</sup>/ha.

## Conclusions

By co-planting crops in the sandy soils of the desert region:

- 1) Between waterings, the amount of moisture in the soil should be 0.4-0.6 relative to the absolute weight of the soil, limited field n achieving 5.1-7.7% more storage than am capacity;
- 2) Ensuring the extension of crop irrigation periods from 12-14 days to 14-16 days;
- 3) During the season, 746 m<sup>3</sup>/ha or 17.1% of water can be saved per hectare.



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