

SOIL SENSITIVITY DEGREE TO SECONDARY SALINATION

I. Kh. Kimsanov

Scientific Research Institute of Cotton Breeding, Seeding and Cultivation
Agrotechnologies, Fargona Scientific Experimental Station, Head of the Laboratory

Abstract

The article analyzes the results of the determination of the salinity level and the creation of cartograms of irrigated agricultural land in the Bostan district of Andijan region, which is part of the Central Fergana region, carried out in 2017. When determining the salinity level, the secondary salinity level of the soils was determined, taking into account the relief location of the research object and the chemistry of salinity, and recommendations were given on the rate, duration, and number of salt leaching operations.

Keywords: Soil, salinity, massif, secondary salinity, soil monitoring, samples, cartography, map..

Introduction

Salinity determination, one of the main activities of soil monitoring, which includes systems for identifying, observing, analyzing and controlling changes in agricultural land under the influence of natural and anthropogenic factors, was carried out on agricultural lands prone to secondary salinity.

It is known that in addition to natural soil formation factors, human agricultural activities also play an important role in the development of the soil formation process. In particular, the agrotechnical methods and irrigation water used in the irrigated areas of our Republic have a significant impact not only on plants and soil properties, but also on the soil formation process. It is necessary to correctly assess all the factors influencing the historical development of soils, which include: the plant world, the climate and relief of the area, the nature of the soil-forming rocks, and human activities. A complete study of the listed factors is important for proper monitoring of the state of irrigated soils and their agronomic characterization.

Determining the level of soil salinity is of great importance in agricultural production. Salinity is one of the main soil processes that determine the fertility, productivity and reclamation-ecological state of irrigated lands. The activation of this process in agricultural lands complicates the use of arable land, delays the timing of modern land cultivation and sowing, negatively affects the normal growth and development of plants, and in many scientific and practical experiments it has been determined that it reduces cotton yield by 20-30 percent in weakly saline lands, by 40-60 percent in moderately saline lands, and by up to 80 percent in strongly saline soils.

Based on the mapping work, a "Soil Salinity" cartogram was created for irrigated lands of 10 massifs in the Bostan district, the composition and scope of agrotechnical and agro-ameliorative measures were planned, and the optimal standards for salt leaching were clearly defined.

When mapping and creating cartograms of saline lands, the 2004 deciphered land use plan



(history), the 2013 farm soil quality assessment maps with a scale of 1:10,000, and the results of previous surveys were used as a cartographic basis.

1. Preparatory work - BostonThe project was carried out in 10 plots of land on an area of 13,120 hectares of agricultural land in the district. On average, one cross-section was dug for every 18 hectares of agricultural land (2-meter cross-sections from 10% of the land area, 1-meter cross-sections from 90%), and soil samples were taken from them.

Cartographic works - maps showing the level of soil salinity drawn in the ArcGIS program were reproduced in the 5th copy, and based on the results obtained, the salinity levels of the soil in the area were shown in the form of a table (attached) in the form of a cross-section of the existing contours of agricultural lands on the agricultural map.

In a situation where salinization processes are accelerating in irrigated lands, preventing salt accumulation and re-salinization processes in the upper root layer of the soil, eliminating their consequences, and solving the problems of land reclamation of irrigated saline lands are among the urgent issues facing agriculture. In this regard, it is extremely important to conduct mapping work on irrigated lands, take into account saline soils and clearly determine salt leaching norms, and plan a set of land reclamation measures based on the results obtained.

The lands of the Bostan district are located in the subtropical desert zone. The soil surface is widely undulating, at an altitude of 450-500 meters above sea level, the annual rainfall is less than 150 mm. The plain part of the Fergana Valley. The vegetation is wormwood, sedge and saltwort. The mechanical composition of the soils, the level of groundwater and mineralization of the studied areas depend on the structure of these geomorphological elements.

In meadow soils, the groundwater level is at a depth of 1.5-2.0 meters, and it develops in hydromorphic conditions. The humus content in the arable layer is 0.75-1%, total nitrogen is 0.06-0.1%, phosphorus content is 0.13-0.14%, potassium is 0.9-1%, mobile phosphorus is 25-35 mg/kg, and exchangeable potassium is 100-200 mg/kg. The soils are subject to varying degrees of salinity. It should be noted that in solving many theoretical problems related to soil salinity, knowledge of the soil and its physical properties is important. The rate of movement, accumulation, evaporation and similar processes of water and salts dissolved in the soil have a specific character in the soil-soil profile of the same mechanical composition (layered soils).

Between irrigation periods, the groundwater level drops to its natural level. This causes salts to move to the lower layers during the irrigation period. During the period between irrigations, groundwater contained in the filtration water enters the capillary moisture and rises upwards.

Groundwater is of the chloride-sulfate type, with a weak to moderate mineralization of 2.0-4.6 g/liter. In the summer, groundwater is less mineralized due to the liquefaction of saline filtration waters.

Table 1 Results of wastewater analysis.

Sample of sewage water	Depth of groundwater, cm	rN	Type	HCO ₃		SO ₄	Ca	Mg	Na+K	Dry residue, gr/l
1	0-130	7.62	S	0.494	0.08	2,704	0.630	0.074	0656	4,638
38	0-145	7.90	S	0.256	0.084	2,604	0.630	0.086	0.510	4,170



Table 2 Classification of groundwater mineralization levels (V.A. Prikлонsky, 1960))

T/r	Groups	Dry residue, gr/l
1.	Freshwater	0-1
2.	Weakly mineralized waters	1-3
3.	Moderately mineralized waters	3-10
4.	Highly mineralized waters	10-25
5.	Highly mineralized waters	25-50
6.	Name	>50

Soil salinization is one of the main soil processes that determines the fertility of irrigated soils and the reclamation and ecological status of arid ecosystems.

The results of the conducted water sampling chemical analysis, the quantity and quality of the salt content, are shown in the explanation drawn up on the salinity cartogram.

Of the total 13,120 hectares of agricultural land surveyed in the district, 3,586.2 hectares, or 27.3%, are not saline, while the total area of saline irrigated land is 9,533.8 hectares, or 72.7%.

Including weakly saline lands, 6793.8 ha, or 51.8%, moderately saline lands, 2589.5 ha, or 19.7%, strongly saline lands, 70 ha, or 0.5%, and very strongly or saline lands, 80.6 ha, or 0.6%.

In most of the areas irrigated by the district, the salinity type is sulfate, and in some cases chloride-sulfate. In the lands with light mechanical composition, inter-valley elevations, it is sulfate, and in the lacustrine deposits with heavy mechanical composition, the salinity type is sulfate-chloride.

Taking these into account, it is necessary to carry out the following actions.

1. Each farm in the massif (region) is obliged to plan water use norms depending on natural and irrigation-economic conditions. The total amount of water withdrawn during the year for cotton and alfalfa cultivation should not exceed 10.0-12.0 thousand m³/ha.

2. Improve irrigation techniques. It is necessary to introduce drip irrigation, because this method ensures uniform moistening of the irrigated soil, consumes less water, and prevents water waste. The irrigation drip should not exceed the acceptable length (45.0-50.0 meters), taking into account the slope of the ditches.

3. Land washed away by salt in early spring should be harrowed as soon as it is ripe, otherwise the moisture in the soil may evaporate again and salinity may occur again.

4. Deep cultivation after irrigation during the cotton growing season reduces soil surface evaporation by 20-30% and prevents salinization. Organic fertilizers, mainly manure, should be applied to soils with reduced humus content.

5. Introduction of appropriate, acceptable and effective methods of agricultural crop rotation.

6. Lowering groundwater levels below critical levels and using more economical irrigation methods.

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