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MEASURES AGAINST SOIL EROSION DURING IRRIGATION

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ABSTRACT: - Today, some changes in soil fertility are observed due to the decrease or increase and change of macro and macro elements in the soil. Due to continental climate change, land use is increasing everywhere in the world, and the demand for irrigation water is increasing. In this regard, the existing limited land areas and water resources are becoming scarce. Careful use of existing limited land and water resources is considered one of the urgent tasks of today. Rational management and effective use of limited land and water resources in our republic and the region, increasing the efficiency of water resources use in field conditions, wide application of modern technologies and the possibilities of their application to production, analysis of solving problems, is one of the main tasks of the region today.

KEYWORDS: Soil salinity, irrigation, water, land, erosion control, global climate, irrigation type, technique, technology.

INTRODUCTION

Soil erosion in Uzbekistan, the causes of its origin, types and distribution laws, methods of studying water and irrigation erosion, scientific bases of wind erosion and the fight against it, irrigation erosion processes on typical and pale gray soils and ways to increase the productivity of soils subject to irrigation erosion, on irrigated lands issues of erosion processes and the fight against it V. B. Hussak and H. M. Mahsudov (1963, 1969); M.N. Zaslavsky (1979); A.N. Kashtanov (1974); H.M. Mahsudov (1968, 1976, 1979, 1982); Q.

Mirzajonov (1973, 1981); A.N. Nigmatov (1983, 1984); Q. Mirzajonov, P.N. Bespalov, A.A. Hamdamov (1975); A.A. Hamdamov, E. Berdikulov (1973), A.A. Hamdamov, K.M. Mominov (1979); A.A. Khannazarov (1976), Sh.Nurmatov (1991, 1992, 1993) have covered it widely.

In accordance with the decision of the Cabinet of Ministers of the Republic of Uzbekistan No. 422 "On the procedure for the establishment and reconstruction of tree groves against wind erosion of irrigated lands and sand inundation of water management facilities", the establishment and reconstruction of the tree grove system is carried out on the basis of the following rules:

• in the areas that have experienced deflation due to strong wind activity;

• in order to protect agricultural land from wind erosion and heat damage;

• to improve the microclimate of irrigated lands and areas close to them, which will help the growth and development of agricultural crops, productivity and product quality;

in the form of a system of forest groves.

It is known that the main link of the analyzed system is the anti-erosion organization of the land ownership (land use) area. As a result of it, it creates an organizational-territorial basis for the implementation of a complex of soil protection measures. In the project, taking into account the flow lines and the directions of harmful winds, it is planned to place forest strips, trees, agrotechnical measures that protect the soil, ways of using land types that will prevent land erosion will be determined.

Preparations for the project are carried out in camera and field conditions.

The following will need to be collected, checked, systematized and studied under camera conditions:

• materials describing physical-geographical and socio-economic factors of land erosion;

• information on the erosion risk of rains, hailstorms, melting waters, directions and intensity of harmful winds, erosion resistance of soils, terrain and vegetation erosion potential;

• materials of previous land surveying, economic assessment of land, soil inspection, land-cadastral developments;

documents on the location of agricultural crops, anti-erosion measures to be implemented.

The plan-map material is made on a scale of 1:10000, the distance between relief cuts is 5.0 m (1.0 or 2.5 m between cuts in farms with complex relief). In the design of normal hydrotechnical structures, it is necessary to use 1:2000 and 1:1000, in some cases, even 1:500 scale plans with relief cuts of 0.1-0.5 m.

In field conditions, the farm area is studied to determine the current state of land types encountering erosion-accumulative processes and the order of implementation of anti-erosion measures. In this, ravines, hydrotechnical structures, tree belts, trees, roads and land types, crop rotation fields and borders of working (irrigation) plots are studied in terms of their influence on the development of erosion.

According to the results of camera and field soil-erosion studies, the slope and directions of the slopes, the level of soil erosion, etc. maps are made.

In order to quantitatively assess the sum of the effects of all natural factors on the process of water erosion, it is necessary to determine the potential leaching of soils. In our opinion, the relationship between water erosion and the factors affecting it can be shown by the following structural expression:

, (1)

where: M is the intensity of soil washing, 1 ha per year t;

h- erosion potential of precipitation, taking into account the power and intensity of rains, snow layer, snow melting intensity, flow layer; n - the indicator that takes into account the types of soils;

m - an indicator that takes into account the mechanical composition of soils, volume weight; - the coefficient that takes into account the level of soil leaching; l- the length of the flow line; i- the slope of the slope; , - coefficients that take into account the shape and direction of the slope, respectively.

In some areas with strong wind erosion, the use of culverts as an additional barrier between one perimeter strip and another is a good result. Kulis is the planting of 2-4 m high tall plants (sunflower, corn, sorghum) and other plants between the main crops to create windbreaks.

As a result of the scientific research conducted by Q. Mirzajonov, the scientific-research institute of cotton selection, seeding and cultivation of agro-technologies, the fight against wind erosion in the conditions of barren soils of Kashkadarya region was carried out by cotton, white sorghum and sunflower.

Figure 2. Fences with curtains

as a result of the implementation of agro-measures on planting seeds and creating fences (kulis) in the area planted with cotton, it was found that cotton productivity increased from 4.7 to 6.3 t/h using white corn and sunflower fences (kulis) against wind erosion.

Crop rotation is known to be important in combating wind erosion and increasing the productivity of eroded soil. Due to crop rotation, soil humus, nitrogen content increases and productivity increases. Also, the physical and chemical properties of the soil are improved, resulting in resistance to erosion. In Uzbekistan, cotton fields are alternated with paddy fields every 3 years. According to the information provided by Uzbek soil scientists, when alfalfa was planted on eroded soil and after three years, the yield increased by 5 tons per hectare.

Data on cotton yield from an experimental field for protecting cotton from wind erosion

with white sorghum and sunflower It is presented in table 2.

Table 2

Cotton yield by terms, t/ha

Option name	Conditions			Total output, tf
	I	II	III	
1	2	3	4	5
Cotton and white sorghum in experiment				
Control (field not protected from wind)	23,0	4,3	2,2	29,5
White corn – 2160, ғўза -7840 м^2	25,2	5,1	3,7	34,0
White corn – 1800, ғўза -8200 м^2	25.4	6,3	4,9	36,6
White corn – 1440, ғўза -8640 м^2	25,3	6,4	3,8	35,5
In an experiment where cotton and sunflower were planted				
Control (field not protected from wind)	22,3	3,6	3,1	29,0
Sunflower – 2160, ғўза -7840 м^2	24,2	5,2	4,3	33,7
Sunflower – 1800, ғўза -8200 м^2	24,3	6,5	5,1	35,9
Sunflower – 1440, ғўза -8640 м^2	24,1	6,2	4,1	34,4

The analysis of the data in Table 2 shows that when developing projects against wind erosion in Surkhandarya region, attention should be paid mainly to soils of the 1st and 2nd groups.

In the territory of the Republic of Uzbekistan, there are all types of erosion, including: water and irrigation erosion, erosion by flowing floods and wind erosion, as well as the harmful effects of wind on plants. These processes directly depend on the climate and relief conditions of the place. The "Davergeodezkadastr" committee studied various types of land erosion and found the following information.

Protection of land from wind and water erosion is considered one of the main problems in further development of agricultural production. For this reason, the "Uzdaverloyiha" Institute developed the "Measures-Measures to Combat Erosion project in the Republic of Uzbekistan". In this project, anti-erosion measures - a set of measures, their size and execution procedure are defined.

According to the results of the conducted research, solving the main issues in the set of anti-erosion measures, along with protecting the soil from erosion, adding 200,000 new lands to agricultural circulation, including 30,000 irrigated lands and 170,000, creating terraces planted with perennial trees on the mountain slopes, rural allows to increase the productivity of agricultural crops by 10-20%.

These activities should be related to natural and climatic conditions and should take into account the accumulated experience of each district. Anti-erosion measures in every farm, like in other farms, should be carried out on the basis of the full and productive use of land and water, and the rational organization of measures that ensure the elimination and prevention of the destructive consequences of erosion processes. They should be aimed at

protecting the land from re-salination, construction, flooding, contamination by industrial waste and other waste.

Table 2

Erodibility of agricultural lands, thousand ha

Name of land types	Total area, thousand ha	Including			
		Not eroded	Water eroded	Wind erosion	Eroded by water and wind
1	2	3	4	5	6
Agricultural land	26734	1551	2700	20478	2005
Including irrigated: A) arable land B) other lands	3733 3308 425	791 569 212	339 341 -	2262 2057 213	341 341 -
Non-irrigated: (meadows with pastures)	23001	851	2346	18125	1679
Not used in q/x plowed lands	17676	-			-

***Compiled based on "Davergeodezkadastr" data**

A well-thought-out system of anti-erosion measures allows to create a basis for increasing the productivity of agricultural crops and land fertility, while solving the immediate tasks of economic development in each farm area.

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