



Impact of the Construction of the Aral Sea on Central Asian Countries

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Abstract: In this article, there is an opinion about the aggravation of the severe ecological situation that is happening today in the areas along the Aral Sea, the deterioration of the ecological situation, the toxic salts that have accumulated at the bottom of the Aral Sea due to the processes of degradation and desertification, etc. held.

Key words: Aral Sea, degradation, desertification, biosphere, salinity, plant cover, groundwater, soil cover, ecosystem, humus.

Soil cover is one of the main components of the biosphere and plays an important functional role in the creation and development of all ecosystems. The formation, transformation, and productivity of the soil cover occur in natural conditions on the basis of certain laws, and an ecological balance is created between the soil and the factors that create it. However, anthropogenic changes occurring in nature change the balance that has been established between ecosystems over the years. Such a situation leads to changes in the soil cover, the biodiversity of the flora and fauna, topography, as well as climate indicators, which are the main components of the biosphere.

In recent years, as a result of the increase in natural and anthropogenic influence in the Aral Sea, the worsening of the ecological situation due to the drying up of the Aral Sea, the interdependence and stability of the soil components in the region has changed negatively, and the natural balance has been disturbed. In some areas, mineralized underground water rose close to the surface, while in other areas, the processes of drying and desertification became active, which led to the increase of salinization processes. Intensification of salinization processes has led to the formation of different salinity levels and types (chemistry) in the regions, a sharp increase in the stock of toxic salts in the soil layers, and as a result, the deterioration of soil fertility and land reclamation.

Under the influence of desertification processes, salt marshes were formed in large areas around the island. The sharp deterioration of the meliorative and ecological condition of irrigated lands, the accumulation of salt in the soil, the activation of secondary salinization processes, the annual increase of areas of saline lands have led to a decrease in the size of cultivated areas and a decrease in the productivity of cultivated crops.

As a result of the processes of degradation and desertification, the toxic salts accumulated at the bottom of the Aral Sea, transported to the irrigated land areas under the influence of defoliation processes, aggravated the ecological and meliorational condition of these land areas, and as a result, the circulating fund of agriculture irrigated fertile land has caused it to go out of production to a certain extent.



In the main stages of desertification, the surface of the irrigated soils of the island regions is covered with a layer of easily soluble salts, and saline-loving halophyte plants spread on these lands. According to our observations, the soil cover is occupied by the plants of *Arabis aphylla* and *Salsola rigida*, which form typical desert shrubs. As a result, under the influence of desertification processes, the barren soils have changed, the soil surface has become densely compacted, layers of different mechanical composition have formed under the compaction, the amount of humus has decreased, the soil cover has dried up, and the level of seepage water has decreased, as well as plants it was observed that sand accumulates around it, and that these areas are mainly occupied by black saxophones

It was observed that the negative consequences of the desertification processes are occurring in the soil cover of the massifs selected from the left and right banks of Amudarya under the influence of natural and anthropogenic factors. According to the results of the conducted soil research, the ground water level in 2010 was 135-200 cm in soils with complex irrigated reclamation conditions, which can fully reveal the conditions of the island's soil cover. , in the years 2016-2018, when the research was carried out, the ground water level is close to the soil surface (120-155 cm on average) and it is common in Khojayli, Shumanay, Amudaryo, Kun'irotd, Mo'inoq and Nukus districts of the Republic of Karakalpakstan. recorded in hydromorphic soils

Under the influence of desertification processes, 84.2 percent of 677.6 thousand hectares of irrigated land in the Aral region (on the border of the Republic of Karakalpakstan and Khorezm region) has become saline to varying degrees, of which 217.8 thousand hectares or 32.14 percent are weak, 188.8 thousand hectares or 27.86 percent are medium, 82.3 thousand hectares or 12.15 percent are strong, and 81.7 thousand hectares or 12.06 percent are very strongly saline soils (Davergeodezkadastr committee information). This situation does not allow to regularly increase the yield of agricultural crops without proper application of agromelioration and agrotechnical measures in the future. Therefore, in order to effectively use land, improve the ecological-ameliorative condition of soils, maintain, restore and increase their productivity, it is necessary to carry out agro-ameliorative, agrotechnical and agrochemical activities in a timely and high-quality manner, as well as to adapt agricultural crops to the soil-climatic conditions of the regions, judicious placement considering the characteristics and performance level is important.

In the regions along the island, under the influence of desertification processes, soils with varying degrees of salinity have been formed. Significant construction of the former "living" delta of the Amudarya began in the 60s of the 20th century. The alluvial deposits brought by the Amudarya waters served as soil-forming parent rocks for thousands of years as a result of the annual flooding of the river. The different mechanical composition of these deposits slows down the flow of ground water, and the high temperature has led to the rapid evaporation of ground water that has reached the surface through the capillary vessels of the soil, resulting in different levels of salinity of the soil covers of the area. In addition, it is noted that the level of mineralization of Amudarya waters increased over the years, i.e., in 1950-1963, it was on average 0.553 mg/l, in 1985 it was 1131 mg/l, in 1997 it was 1148 mg/l, and in 2008 it increased to 1250 mg/l done Under the influence of desertification processes, it was observed that the



processes of soil formation on the dry bottom of the sea, sands, loams, sandy loams, clayey rocks have started to undergo radical changes. In particular, various changes occurred in the characteristics of the soil cover of Shumanay district during the next 50-60 years, and these changes were clearly reflected in the amelioration of irrigated soils. In particular, in 1966, weakly saline land areas in the district accounted for 33.4% of the district's total area, moderately saline land 22.2%, strongly saline land 26.6%, and very strongly saline land was 14.6%, respectively 20.8% in 2017; 47.7%; 16.7% and 14.8% (Fig. 1). It can be seen that over the past 50 years, the area of strongly, very strongly, and weakly saline soils has decreased, while the average saline area has increased.

The increase in the amount of easily soluble salts in the composition of irrigation water has also affected the irrigated soils, that is, continuous irrigation over the years has led to the accumulation of salts in the soil. This was the primary source of desertification processes in these soils. Cl and SO₄ salts have always dominated the salt content of irrigated meadow alluvial soils in the region. In irrigated meadow alluvial soils, the amount of humus depends on the mineralization of organic residues, humidity and topography, depending on the flora and fauna of the soil. As a result of degradation and dehumification of the studied soils due to the desertification process, it was noted that the amount of humus decreased. The humus content in the plow layer of newly irrigated meadow alluvial soils is on average around 0.968%, and it is observed that it sharply decreases starting from the sub-plot layer. These soils are low in humus. Productivity indicators of newly irrigated meadow alluvial soils directly depend on tillage during the growing season, use of organomineral fertilizers, improvement of land reclamation. The lack of stratified application of organic and mineral fertilizers to the soil, insufficient replacement of the substances removed by agricultural crops, caused imbalance in the fertility of these soils.

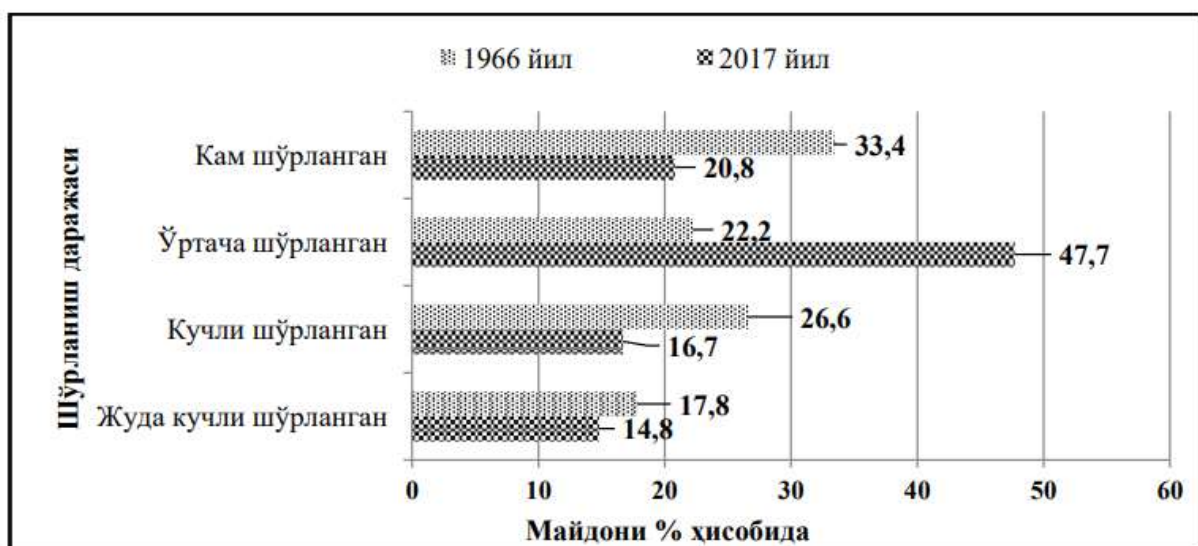


Figure 1. Dynamics of salinity of irrigated soils, in % of area, (as an example of Shumanay district)

Analysis of long-term data shows that arable layers of newly irrigated meadow alluvial soils with mobile phosphorus.



1-table.

Changes in the amount of mobile phosphorus and exchangeable potassium in newly irrigated meadow alluvial soils.

Тупроқ номи	Қатламлар чукурлиги, см	Ҳаракатчан фосфор мг/кг ҳисобида					
		1966 й.*		1995 й.**		2017 й. **	
		P ₂ O ₅	K ₂ O	P ₂ O ₅	K ₂ O	P ₂ O ₅	K ₂ O
Суғориладиган ўтлоқи аллювиал тупроқ, кучсиз шўрланган	0-24	20,2	281	24,0	184,8	28,5	139
	24-37	18,9	233	19,2	192,8	25,0	84
	37-54	14,7	201	15,1	168,7	13,0	96
	54-86	11,1	145	13,2	176,7	11,0	65
	86-117	7,1	134	11,6	132,6	10,3	63
	117-140	6,8	87	10,5	132,6	9,0	47
	140-175	4,1	-	3,8	-	4,1	-

*Data from 1966, data from the State Committee for Soil Inspection (former Republican Soil Expedition)

**Data from ITI of Soil Science and Agrochemistry in 1995 and 2017

The newly irrigated meadow alluvial soils of Shumanay district are low in humus and mobile phosphorus substances, and in turn, in exchangeable potassium, 281 mg/kg (average) in 1966, 184.6 mg/kg in 1995 (low) and in 2017 it was 139 mg/kg (low), and during the past time, exchangeable potassium in the soil layers has also decreased, and as a reason for this, sufficient amounts of potassium mineral fertilizers have been applied to the soil in recent years. we can show that it is not included (Table 1).

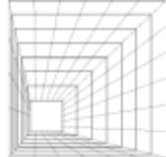
In conclusion, it can be said that according to the data obtained in the research carried out in 2010-2018, under the influence of degradation and desertification processes, it was observed that the dehumification processes are taking place differently in the irrigated and pasture soils of these regions. Compared to the total irrigated land studied, the soils of 1.5% of the areas are above average with humus (1.5-2.0%), 47.0% of the areas have an average of 1.5%, and 51.5% of the areas have less than 0.5 Provided in % and level. Soils with a low supply of humus were recorded in the irrigated soils of Kungiro, Khojaly, Beruniy, Kegeili, Chimboy, Takhtakopir, Qonlikol districts. Degumification processes are carried out in alluvial alluvial soils of the main massifs, including 49.62% of the total irrigated land in the massif named after Y. Okhunboboev in Kungiro district, 51.57% in Shorokhan massif in Tortkol district. , 51.78% in Tolkin massif of Amudarya district, 67.48% in Marjonkol massif of Takhtakopir district, 85.1% in Yangier massif of Ellikkala district, Okmangit of Nukus district and K of Kegeyli district. It is 100% in the massifs named after Abibullaev. 83.8 percent of land areas in these regions have very low (0-15 mg/kg) and low (15-30 mg/kg) mobile phosphorus, 11.5 percent have moderate (30-45 mg/kg), 4, 7 percent provided above-average levels (45-60 mg/kg). And with exchangeable potassium, 71.8% of the land areas provided with very low 100 mg and low (100-200 mg/kg), average (200-300 mg/kg) -19.5%, and above



average (300-400 mg/kg) was found to be 8.7% of the supplied areas. The processes of desertification covered the ancient alluvial plain of Janadaryo, Karaozak and Takhtakopir districts. The main soil cover consists of a complex of brown, barren, barren, salty, sandy desert and sands. At the same time, the processes of degradation and desertification in the ancient alluvial plain of Aqchadarya were observed in the field research. The ancient alluvial plains of Akhchadarya begin from the Tuyamoyin regions of Amudarya and pass through the territories of Tortkol and Beruniy districts and form the Suvyorgon lake system. The lower delta of Akhchadarya has been covered by sand due to desertification processes. In these regions, large areas are occupied by sand dunes, dunes, and dunes formed by sand dunes.

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