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МИРЗО УЛУҒБЕК НОМИДАГИ ЎЗБЕКИСТОН МИЛЛИЙ УНИВЕРСИТЕТИ ИЛМИЙ ЖУРНАЛИ

ЖУРНАЛ 1997 ЙИЛДАН ЧИҚА БОШЛАГАН

2022

3/2

Табиий фанлар

ТОШКЕНТ – 2022

Геология

O‘ZBEKISTON MILLIY UNIVERSITETI XABARLARI, 2022, [3/2]
ISSN 2181-7324

BIOLOGIYA
https://science.nuu.uz/
Natural sciences

УДК:631.459:631.434.52:528.9:004(757.121)

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PROSPECTS FOR THE USE OF DEGRADED SOILS (ON THE EXAMPLE OF ANDIJAN REGION)

Abstract
In arid climates, the main factors leading to soil degradation are their erosion, salinization, depletion of humus and nutrients, and contamination with toxic and heavyelements. As a result of degradation processes, 10-12 million hectares of land are lost from agricultural use every year. Developing practical recommendations for improvingsoil fertility through the use of effective methods and technologies based on preventionof soil degradation, rehabilitation of saline, eroded, humus and basic nutrient depleted lands, restoration, increase and protection of soil fertility, noting changes in the ecological and reclamation situation was released.
Key words: degradation, soil, ecology, erosion, salinization, heavy metals.

ПЕРСПЕКТИВЫ ИСПОЛЬЗОВАНИЯ ДЕГРАДИРОВАННЫХ ПОЧВ (НА ПРИМЕРЕ АНДИЖАНСКОЙ ОБЛАСТИ)

Аннотация
В условиях засушливого климата основными факторами, приводящими к деградации почв, являются их эрозия, засоление, истощение гумуса и питательных веществ, загрязнение токсичными и тяжелыми элементами. В результате деградационных процессов ежегодно из сельскохозяйственного использования теряется 10-12 млн га земель. Разработка практических рекомендаций по повышению плодородия почв за счет применения эффективных методов и технологий, основанных на предотвращении деградации почв, реабилитации засоленных, эродированных, обедненных гумусом и основными элементами питания земель, восстановлении, повышении и охране плодородия почв с учетом изменения экологических и ситуация рекультивации была освобождена.
Ключевые слова: деградация, почва, экология, эрозия, засоление, тяжелые металлы.

DEGRADATSIYAGA UCHRAGAN TUPROQLARDAN FOYDALANISH ISTIQBOLLARI (ANDIJON VILOYATI MISOLIDA)

Annotatsiya
Qurg'oqchil iqlim sharoitida tuproqlarni degradatsiyasiga olib keladigan asosiy omillar - ularning eroziyaga uchrashi, sho'rlanishi, chirindi va ozuqa moddalarining kamayishi, zaharli va og'ir elementlar bilan ifloslanishi kabilar hisoblanadi. Degradatsiya jarayonlari natijasida har yili 10-12 million gektar yer qishloq xo‘jaligida foydalanishdan chiqib qolmoqda. Tuproq degradatsiyasining oldini olish, sho‘rlangan, eroziyaga uchragan, chirindi va asosiy ozuqa moddalari kamaygan yerlarni tiklash, tuproq unumdorligini oshirish va muhofaza qilish, ekologik va ekologik sharoitlardagi o‘zgarishlarni hisobga olgan holda samarali usul va texnologiyalarni qo‘llash orqali tuproq unumdorligini oshirish bo‘yicha amaliy tavsiyalar ishlab chiqishga bag`ishlangan.
Kalit so'zlar: degradatsiya, tuproq, ekologiya, eroziya, sho'rlanish, og'ir metallar.

Introduction. According to the Internet, 12.0 million hectares of land are degraded, of which 1,094.2 million hectares (55.7%) are affected by water and irrigation erosion, and 548.1 million hectares (27.9%) are affected by wind erosion. Due to the reduction of nutrients in the soil, salinization, pollution, acidification, 239.6 million hectares (12.2%) and 82.5 million hectares (4.2%) of land deteriorated dueto compaction, swamping and subsidence.

One of the most important priorities in our country has been the efficient use and protection of landresources through the prevention and mitigation of soil degradation, the efficient use of soils, the improvement of reclamation, the preservation, restoration and increase of fertility.

Effective use of limited water resources in recent years, restoration of agricultural land biofund, re- use of saline and eroded areas, conservation of ecosystem biodiversity, effective transfer of education, research and development in key areas such as "green energy" and agro-technologies required. To address such pressing global challenges, priority is given to expanding investment and research, raising scientific capacity to a new level through the widespread introduction of digital technologies, and training engineers capable of applying developments in practice (PQ 42).

Data and methods. In recent years, comprehensive monitoring has been carried out on irrigated and pasture lands in the foothills of Andijan region. Changes in the ecological and reclamation status were noted, based on the use of effective methods and technologies based on the prevention of soil degradation, rehabilitation of saline, eroded, humus and basic nutrient depleted lands, restoration, increase and protection of soil fertility. Practical recommendations for improving soil fertility have beendeveloped. Recommendations have been made to study the current state of irrigated, dry and pasture soils in the foothill proluvial-deluvial plains, as well as the efficient and rational use of land resources. Improving the quality and increasing the quantity of agricultural products will increase the export potential of the country, the implementation of the food program.

The general climatic conditions of the region vary according to their characteristics in individual places. Due to the fact that the Fergana Valley is located in a closed basin, it protects against stable weather and sudden high temperatures in winter. The location of the Fergana Valley is located at the intersection of the provinces of Turan and Central Asia, so the gray soils are slightly higher.

According to the Poytug and Andijan meteorological stations in Andijan region, the climate of the study area is dry, with average temperatures ranging from -2.3 to 2.7 oC in January and 26.9-27.1 oC inJuly. The sum of the effective temperatures (above 10 oC) is 4600-4800o per year. The vegetation periodof the plants is observed to be around 220 days, with the last cold days observed between 7 February and 4 March, while the initial cold days are observed between 10 November and 2 December. Cold daysare 45-77 days.

Annual precipitation is 261-305 mm, the highest amount of precipitation falls in winter and spring, with almost no precipitation in summer. The maximum monthly amount of precipitation was 35-38 mm,the maximum daily amount was 8.4-21.9 mm. The lowest rainfall is in the summer months. In particular,according to the Andijan meteorological station, 52.4% of the total annual precipitation falls in the spring, 32.0% - in the winter, 8.9% - in the autumn, the lowest precipitation is in August-September. The snow cover is unstable, its thickness is usually 7-19 cm, in some cold years its thickness reaches 28-35 cm.

The highest level of total evaporation is in July and August, and the minimum is in January. As a result of strong winds blowing in the area, light mechanical composition erodes the soil layer (wind erosion is observed) and causes the evaporation process to intensify. As a result, the surface of the soil dries out.

The average annual relative humidity fluctuates from 58% to 64%. Its highest values (64%) are observed in the vicinity of the Kara-Darya River and in areas with developed irrigation systems and neargroundwater, the lowest amount (<58%) is observed in the Poytug meteorological station.

In the eastern part of the valley, the maximum speed of the north wind direction during the year is 20-23 m / s. As a result of the cold air flow of the northern latitude, heavy rains were observed in the region and strong winds were formed as the air temperature dropped.

Andijan region is located in the eastern part of the Fergana Valley. The territory of the region is bounded on the north and northeast by Fergana, on the south by the Pamir-Alay mountain ranges.

bounded by i, it is the last part of the Tien Shan mountain system. They are not only orographically related to the Tien Shan mountain system, but also have a common geological structure and formation.From the foothills of the Fergana ridges, the topography of the region's lands decreases to the south, aswell as to the north-east and south-west. Territories of Andijan region are divided into four major geomorphological regions: mountainous, foothills, hills and plains (valleys) according to the development of geomorphological structure, relief-forming factors. The mountainous area occupied thenorthern and northeastern parts of the province. These are the Fergana and Alay mountain ranges. Intrusive-effusive rocks are involved in the formation of these two mountain ranges and they are composed of granite, gypsum, shale and other rocks.

Materials and methods. In 2020, field surveys were conducted in three key ecological and semi-stationary ecological areas (SEMand YaSEM) of 1 hectare, allocated in 11 key areas (KA) of 100 hectares, selected for monitoring studiesof agricultural lands of Andijan region (Figure 1).

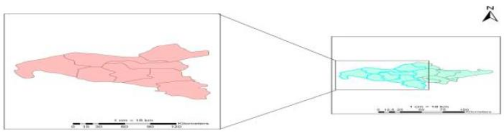

Figure 1 Study area.

The morphological structure and main features of the soil profile were studied in the main field excavations in the Andijan region, samples of soil and groundwater were taken for laboratory-analytical research. Analytical research UzPITI "Methods for studying the agrophysical, agrochemical and microbiological properties of soils in cotton fields" (1963), TAITI "Guidelines for the use of total humusand mobile humus in the soil as an indicator of its productivity" (2006) and developed and adopted at the Institute methods (2004).

I KM located in SEM-I (KM-key area; SEM-stationary ecological area) 1-section. Kurgantepa district is located on a previously irrigated hilly plot of land of Khanabad farm. dark gray soils composedof lyossimon deposits. The relief consists of strongly twisted, hills and cliffs with a complex structure. The soils are washed out, and in these places partially irrigated dark gray soils are scattered. The soils are subject to varying degrees of erosion. Sizot waters are very low, the mechanical composition is heavy and sometimes consists of medium sands.

0-35 cm. Dark gray color, the soil surface is dry, heavy sandy, moderately compacted, grassy layer, plant roots are abundant, small traces of small roots and underground insects are found, moderately coarse, clear to the next layer.

35-60 cm. Gray color, low moisture, heavy sandy, dusty structure, moderately dense, processed layer of underground insects, traces of rotten and semi-rotten roots of plants and small underground insects, carbonate nodules occur, depending on the transition moisture to the next layer.

60-103 cm. Light gray color, low moisture, heavy sandy, granular structure, strongly compacted, traces of underground animals and ground cocoons, roots occur, carbonates are abundant, the transitionto the next layer is slow.

103-161 cm. Light gray color, low humidity, heavy sandy, dusty structure, very strongly compacted,plant roots are rare, carbonate grains are mixed.

According to the external signs and mechanical composition of the above soil profile, dark gray soils are mainly heavy sandy, saline, weakly saline, sometimes unsalted, according to the degree and type ofsalinity.

Due to the fact that the dark gray soils of the mountainous areas of the region are adequately supplied with constant atmospheric precipitation, it was observed that the dissolved carbonates in the soil are constantly washed away, the carbonates dissolved in the soil profile and occur in solid form (clay).

Typical irrigated gray soils are spread on the lyoss wavy hills of the Y.Okhunboboev massif of the Marhamat district of the 2nd KM. Key area soils include hill ridges. The lands in the foothills of the Pamir-Alay ridges are re-irrigated. The relief of the place consists mainly of hills. The soils are irrigatedtypical gray soils formed from lyoss deposits. The soils are finely saline with high carbonate fine structure. These soils differ in drive layer, porosity, aeration (air permeability), and biological activity. Due to the high porosity in these soils, water permeability and air exchange are good.

Section 1 located at SEM-I. Massif named after Y.Oxunboboev. Typical irrigated gray, medium sandy soil. 12 km from the district center. located in the southeast. A field planted with wheat. The resulting soil genetic layers are as follows:

0-32cm. Dark gray, moderately moist, medium sandy, coarse-grained structure, traces and nests of underground insects (earthworms), sometimes fine-grained stones are more common, slightly denser, plant roots are more common, depending on the density of transition to the next layer.

32-63cm. Dark gray, moderately moist, moderately sandy, fine-grained, moderately dense, traces ofunderground insects are found, rarely polished stones (diameter 5cm.), Roots sometimes appear semi- rotten roots, the transition to the next layer is noticeable according to new lesions.

63-100cm. Dark gray, moderately moist, moderately sandy, granular, moderately dense, traces of underground insects are found, rarely polished stones (5 cm in diameter), spots of roots, carbonate and gypsum, the transition to the next layer is clear according to the mechanical composition.

100-140cm. Light gray, moderately moist, moderately sandy, moderately compacted, rocky mixed fine-grained soil layer, roots are rare, in rare cases smoothed stones, carbonate and gypsum stains are common.

Soil-forming rocks of typical irrigated gray soils consist of deluvial-proluvial, sometimes skeletal deposits. As a result of new use in irrigated agriculture, a 0.2-0.25 cm thick agroirrigation layer was formed. The soil profile is moderately compacted, well treated with earthworms, uniformly gray in colorup to 50 cm, with a granular structure. M of typical gray soils irrigated- the high content of large dust particles in the mechanical composition is the decomposition that takes place in the soil as a result of long-term tillage and irrigation.We can see that these soils are mainly weakly saline, some cuttings are not saline (6-7 cuttings), and 1 cut is weakly saline in the chloride-sulphate type.

III KM Irrigated typical gray soils of lyossimon hills located on the northern slopes of the Andijan hills. This key area is located in the massif named after A. Pattaev of Andijan district. These areas are relief lyossimon-proluvial hills with slopes extending to the northwest. This key area is around 676 meters above sea level and is a typical gray soil with irrigated soils. The soils are civilized, with rocks of varying degrees in the soils. They occur 0.5–1.0 underground and sometimes deeper.

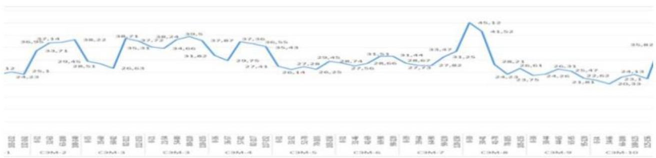

Figure 2. Distribution of mobile form of chromium in irrigated soils of Andijan region

Figure 3. Distribution of nickel in soil profile

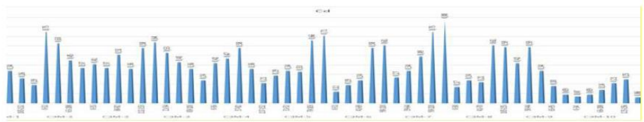

Figure 4. Distribution of cadmium element in soil

According to the mechanical composition of the typical irrigated gray soils studied, the upper drivingand sub-driving layers were mostly sandy, and it was observed that the cross-section was towards the lower parts in a changitmon structure (79-155 cm). In the irrigated soils of the region, the amount of dryresidue in the drive layer is weakly saline, averaging 0.415-0.705%. Sulfate-type salts were identified according to the salinity type.

According to the mechanical composition of the typical irrigated gray soils studied, the upper drivingand driving underlying layers were mostly medium sandy, and it was observed that they were heavier (70-103 cm) towards the lower parts of the section. In the irrigated soils of the region, the amount of dryresidue in the drive layer is weakly saline, averaging 0.310-0.380%. Sulfate-type salts were identified according to the salinity type.

Results and Discussion. According to the results obtained, SEM-5, SEM-11, SEM-6, SEM-10,

SEM-3, SEM-2, SEM-1 soils were found to be moderately supplied with mobile copper.

1) The studied soils are mostly moderately and below average supplied with mobile zinc.
2) Soils were found to be low, moderate, and high in manganese in mobile form.
3) Soils with water-soluble boron were observed to provide moderate and high amounts.

Today, 1.4 million hectares of land contaminated with heavy metals have been identified in agriculture worldwide, of which the share of soils contaminated with primary hazardous elements is 2% and secondary hazardous elements (copper) is 3.8%. According to the Vostok meteorological center, about 1,100 tons of lead are shipped to Russia annually from sources in

Ukraine, 180-190 tons from Poland and Belarus, more than 130 tons from Germany, and 40 tons of cadmium annually from Ukraine, almost9 tons from Poland and 7 from Belarus. tons, 5 tons more from Germany.

Multilateral pollution of the environment, including contamination with elements such as fluorine, chromium, sesame, lead, zinc and cobalt, is leading to a deterioration of the environmental situation. Along with mercury, cadmium, lead, copper, zinc, selenium, and cobalt, nickel is also one of the most essential metals in terms of environmental impact; the circulation rate of nickel is 19.1% (for copper this level is 40.9, for lead 40.0, for zinc 27.0, for mercury 20.6%). The literature shows that heavy metalsare natural additives to mineral fertilizers. They are especially common in simple superphosphate formations: cadmium (50-170 mgkg), chromium (66-234 mgkg), lead (7-92 mgkg), nickel (7-32 mgkg)

[2].

Today, the emergence of new manufacturing plants is leading to fluoride poisoning of all living organisms. Fluoride salts moving along the atmospheric air-soil-water trophic chain accumulate in the bones of the human body. Under the influence of fluoride leads to changes in the shape and color of teeth, osteochondrosis, their direction of growth, stiffness and mobility of joints, as well as bone growth.Unfortunately, to date, not enough attention has been paid to the development of a system of measures to prevent pollution of agricultural lands, which determines the quality of food and human health.

Toxic elements that pollute the soil (heavy metals - lead, vanadium, chromium, manganese, cobalt, nickel, copper, zinc, bismuth, molybdenum, antimony, cadmium, iron, etc.) come from various objects.Results of ecological research in the studied soils. In the irrigated soils of Andijan region, the elementschromium, nickel, cadmium, lead and fluorine were studied from the mobile forms of heavy metals, andvarious accumulations were observed in the soil.

Chromium is found in varying amounts in plant and animal organisms. However, some plants, includingmedicinal plants, have the ability to accumulate the element chromium. For example, the average amount of chromium in the leaves of the Digitalispurpurea plant is 14.1 mg / kg dry matter. The coefficient of biological absorption of chromium by terrestrial plants is Kb = 1.03. Excess chromium inthe soil causes various diseases in plants.

Accumulation of chromium in the soil (50-70 mg / kg of dry matter) causes it to move in the food chain(soil - plant - animal - human). Environmental pollution leads to an increase in the amount of chromiummoving in this chain. In addition, contamination of pastures and other plants with chromium (average

0.1-0.5 mg / kg dry matter) leads to the entry of large amounts of chromium into the human body alongwith food.

In the dark gray soils of Kurgantepa district, the lowest value of the mobile form of chromium was foundin the driving layer of the soil - 21.74 mg / kg, and the highest value was found in the layer of 103-132cm - 25.1 mg / kg.

This element has been observed to increase from the drive layer of the soil towards the lower layers. Nickel, lead, cadmium and fluorine elements were detected in samples taken from soils scattered in the district. It can be seen that the chromium element is less than the allowable amounts (REM) for the soil,but a slight rise in the driving layers of some soils can be seen approaching the REM (10 mg / kg) of lead in the 0-35 cm layer.

In order to compare the typical irrigated gray soils of Andijan district, two sections were obtained. can be associated with the use of.

The allowable amount of chromium element in typical gray soils irrigated in Marhamat district (REM)only 33.71 mg / kg in the 0–32 cm layer, the chromium was found to be slightly higher towards the lower layers, and increased to 1.09 times the REM towards the 100–140 cm layers from the 32–63 cm layer. 38.22 mg / kg was found to accumulate.

Conclusions. In conclusion, in the soils of the studied region, the mobile form of chromium, nickel, cadmium and lead elements was returned to be 1.2 times and 1.6 times higher than REM. In old and newly irrigated soils, as a result of primary irrigation, under the influence of mineral fertilizers, which are widely used in agriculture, as well as lead pollution from motor fuels is widespread.

Chemical analysis revealed that α-GXTsG accumulated from the 0–30 cm layer of all sections to the bottom and indicated that this element had begun to decompose, or that the pesticide content of this layer may have been reduced by plant accumulation.

According to the accumulation of g-GXTsG in the cross-sectional profile, it can be observed that all cross-sections increase from 0-30 cm to the lower layers, but GXTsG metabolites, which are the main contaminants, are still in the process of decomposition.

Concluding studies revealed that the decomposition process of metabolites of organochlorine pesticides that are not currently used in the irrigated soils of the region continues.

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