British Journal of Global Ecology and Sustainable Development
Volume- 45, October 2025
ISSN (E): 2754-9291

RECULTIVATION OF ABANDONED LAND AND IMPACT ON SOIL FERTILITY OF SUBSEQUENT CROP PLANTS

Reymov Omirbai
Agriculture of Karakalpakstan and "Water Management and Land" of the Institute of Agro-Technologies Assistant Teacher of the Department of Use
omirbayreymov9@gmail.com.

Zamir Bekbergenov
2nd-Level Student of the Karakalpakstan Institute of Agriculture and Agro-Technology, Department of Land Management and Land Cadastre.

Reimov Nietbay
Professor of the Department of "Water Management and Land Use" of the Karakalpakstan Institute of Agriculture and Agro-Technology, Agricultural Sciences
niyetbay.reimov@bk.ru

Abstract
Water shortages in the Republic of Karakalpakstan, the lack of equal access to all water-consuming areas, the reconstruction and expansion of roads and railways, the premature death of old trees, and other factors have led to the need to bring unused arable land into circulation in Karakalpakstan. The article presents data on the yield of agricultural crops obtained on the control variant of land without reclamation and after its implementation, the effectiveness of various methods of maintaining soil fertility during reclamation, their impact on soil fertility, and the economic efficiency of reclamation work.

Keywords: Karakalpakstan, land use, reclamation, unfavorable climate, land, soil, fertility, cadastre, harvest, economic efficiency.

Introduction

In the Republic of Karakalpakstan, the question of planting, germination, growth, development, productivity and economic efficiency of various agricultural crops in order to bring the lands out of active use for various reasons into active use again is an urgent issue.

In the world, including in Karakalpakstan, there is a need to re-use arable land that has fallen out of use due to the increasing water shortage, the new expansion and reconstruction of railway and highway roads, the timely growth of old trees, and the fact that the inter-farm and intra-farm land structure is not properly structured.

Relevance of the topic.

Decree No. 5853 of the President of the Republic of Uzbekistan dated October 23, 2019 "On approval of the strategy of agricultural development of the Republic of Uzbekistan

for 2020-2030", Decree of the Cabinet of Ministers of the Republic of Uzbekistan dated April 29, 2023 "Recultivation of degraded lands, preservation of the fertile soil layer and organization of its rational use on measures No. 169, dated January 18, 2017 No. PQ-2731

In order to apply "On the state program for the development of the Aral region in 2017-2021" to re-use lands that have fallen out of use in world agriculture, various scientific results have been obtained on the preservation, restoration and improvement of soil fertility: high-quality, intensive and Maximum use of the Decree No. PF-5853 on approval of the strategy for 2020-2030.At the same time, scientific research works are being carried out on maintaining soil fertility, keeping the land in active use, quality recultivation of the land in growing the planned crop from agricultural crops, and determining which agricultural crop we will benefit from the recultivated land when we plant it.

Literature analysis and methodology

World scientists on the recultivation of disused lands - such as G. Schulz in Germany, S. Volkov, V. Williams in Russia, B. Volger, H. Gardner in the USA, J. Bussengo in France, A. Shideldorf in Germany, K. Binder in Australia - studied the importance of putting the land back into active use and obtained comprehensive results.S.Avezbayev, A.Bobojanov, K.Rakhmanov, R.Turaev and other scientists conducted scientific research on land management, cadastre and land monitoring in different soil and climate conditions of our republic. However, in the conditions of the soils of the Republic of Karakalpakstan, the issues of recultivation of disused lands and the effect of the next planted crops on soil fertility have not been studied and scientific recommendations have not been given.Reclamation field experience of reclamation works 17.5.1.02-85. It was carried out in the direction of agricultural recultivation of GOST.The research was carried out in the districts of the Republic of Karakalpakstan, on farm lands in need of recultivation by the method of field experiments, in which methodological instructions for land recultivation; harvesting, conservation and rational use of the fertile layer of the soil. Tashkent; ID-1255. 2018.; 1:10000, 1:25000 scale maps of Takhtakor district farms; document of engineering searches for construction (KMK 01.07.97y.); instruction on topographic map; B.A. Dospekhov's "Methodology of Experimentation" 1985; statistical processing of the data obtained from the experiments was carried out by the one-factor dispersion method of B.A. Dospehov.

Results

Field research experiments were conducted on the farm lands of "Allamurat Takkha", "Ataniyaz Sultan", "Pirniyaz ata", "Pirniyaz Takkha", "Gapur Takkha", "Atabay Mukhtar", "Kaharman Takkha" Takhtakópir District of the Republic of Karakalpakstan, Takhtakópir District, Republic of Karakalpakstan.

In the experiment, in addition to the first control option, when we tried a number of non-planted options, in addition to the first control option, various agricultural crops were planted - sorghum, wheat, sorghum, sesame, millet, alfalfa, alfalfa, mash, and beans.In the first non-recultivated control option, the dynamics of soil humus change decreased by -0.034% in the first year of the experiment. In the second year of the experiment, when we evaluated the effect of various agricultural crops on the change in the amount of soil humus (humus) after recultivation of the unused land, the amount of humus in the soil at the beginning of the first year of the study period in the spring was 0.636 as a percentage of the total weight of the soil.

In the first year of the experiment, the amount of soil humus at the end of the period was equal to 0.603 and decreased by 0.033% during the period from spring to autumn.In the first year of the study, the amount of soil humus decreased by 0.03% from the end of the period of operation to the beginning of the period of the second year of the experiment, that is, in the spring. The reason for this is that after land reclamation works, as a control option, the amount of soil humus was reduced due to the fact that crops that leave behind root and root residues were not planted, and due to the annual natural loss of soil humus with the amount of humus used during the operation.In the second year of the study, in the control variant, the amount of humus in the soil was equal to 0.600% at the beginning of the operation period, and decreased to 0.570% during the operation period.

In the third year of the study, in the control version of the experiment, the amount of humus in the soil was equal to 0.531, and the amount of humus decreased. At the end of the experiment, the amount of soil humus decreased to 0.501%, and the change dynamics of soil humus from the spring of the first year of the study to the autumn of the last year of the study was equal to -0.135%.In the second variant of the study, in which no crops were planted after recultivation, the amount of humus in the soil at the beginning of the first year in the spring was equal to 0.633% of the total weight of the soil.

This amount of soil humus indicates that the composition of the soil of the Republic of Karakalpakstan has a very low amount of humus, which is the main element of soil fertility. In the first year of the experiment, the amount of soil humus at the end of the period was equal to 0.595, and during the period of the period it decreased by 0.035% from spring to autumn.From the end of the period of the first year of the research to the beginning of the period of the second year of the experiment, that is, the amount of soil humus decreased by 0.05.

The reason for this is that the amount of root and root residues left after the harvest is very small, and the annual natural loss of soil humus with the amount of humus used during the operation, the tendency of the amount of soil humus to decrease was observed. In the second year of the study, the amount of humus in the soil at the beginning of the period was 0.600% and decreased to 0.564% during the period.

In the third year of the research, the amount of humus in the soil was equal to 0.526, and the amount of humus decreased. At the end of the experiment, the amount of soil

Journal Zone Publishing, Ilford, United Kingdom

humus decreased to 0.483%, and the change dynamics of soil humus from the spring of the first year of the study to the autumn of the last year of the study was equal to -0.150%.

In the third version of our research, where cotton was planted, the amount of humus in the soil in the first year of the research period was 0.639 as a percentage of the total weight of the soil. This amount of soil humus indicates that the composition of the soil of the Republic of Karakalpakstan has a very low amount of humus, which is the main element of soil fertility. In the first year of the experiment, the amount of soil humus at the end of the period was 0.600, and it decreased by 0.039% from spring to autumn during the period.From the end of the period of the first year of the research to the beginning of the period of the second year of the experiment, that is, the amount of soil humus decreased by 0.02. The reason for this is that the amount of root and root residues left after the harvest is very small, and the annual natural loss of soil humus with the amount of humus used during the operation, the tendency of the amount of soil humus to decrease was observed. In the second year of the study, the amount of humus in the soil at the beginning of the period was equal to 0.598%, and during the period it decreased to 0.549%.In the third year of the research, the amount of humus in the soil was equal to 0.540, and the amount of humus decreased. At the end of the experiment, the amount of soil humus decreased to 0.476%, and the change dynamics of soil humus from the spring of the first year of the study to the autumn of the last year of the study was equal to -0.163%. In the fourth variant of the experiment, where winter wheat was planted, the amount of humus in the soil at the beginning of the first year of the research period, in the spring, as a percentage of the total weight of the soil, was equal to 0.635. This amount of soil humus indicates that the composition of the soil of the Republic of Karakalpakstan has a very low amount of humus, which is the main element of soil fertility. In the first year of the experiment, the amount of soil humus at the end of the period was equal to 0.623 and decreased by 0.012% from spring to autumn during the period.

From the end of the operational period of the first year of the study to the beginning of the operational period of the second year of the experiment, the amount of soil humus increased by 0.05% due to the effect of the rotting and turning into humus of the root and stem residues left by the wheat crop in the operational period in autumn-winter and spring.

The reason is that wheat has a much higher amount of root and stem residues left behind compared to cotton and a higher humus conversion coefficient, so it was observed that the amount of soil humus increased slightly or close to the previous state.In the second year of the study, the amount of humus in the soil was equal to 0.628% in the wheat-planted variant at the beginning of the operation period, and during the operation period it decreased to 0.625%.In the third year of the experiment, the amount of humus in the soil was equal to 0.648%, and the amount of humus decreased. At the end of the experiment, the amount of soil humus decreased to 0.639%, and the change dynamics of soil humus from the spring of the first year of the study to the fall of the last year of

Journal Zone Publishing, Ilford, United Kingdom

the study was equal to -0.004%.In the fifth variant of our study, where sorghum was planted, at the beginning of the first year of the study, the amount of humus in the soil was equal to 0.640 as a percentage of the total weight of the soil.

In the first year of the experiment, the amount of soil humus at the end of the period was equal to 0.598% and decreased by 0.042% during the period from spring to autumn. It was observed that the amount of soil humus increased by 0.13 from the end of the period of the first year of the study to the beginning of the period of the second year of the experiment, i.e. spring. Therefore, the amount of soil humus-humus has been accumulated in the autumn-winter-spring period, since the underground roots and above-ground remains of the sorghum crop left behind during the operation period and in the autumn-winter-spring period are significantly accumulated. In the second year of the study, the amount of humus in the soil was 0.611% at the beginning of the operation period, and during the operation period it decreased to 0.570% against the background of planting sorghum, the decrease difference was equal to 0.041.From the end of the period of the second year of the study to the spring of the third year of the study, the amount of humus in the soil decreased by 0.033%.In the third year of the study, the amount of humus in the soil was 0.537 in the sorghum-planted version, and it showed that the amount of soil humus decreased to 0.505% at the end of the experiment.

For three years, from the spring of the first year of the study, compared to the autumn of the last year, the change dynamics of soil humus or humus decreased by -0.135%, proving that sorghum is a plant that transports nutrients from the soil at a moderate level.In the sixth variant of the experiment, where sesame was planted, at the beginning of the first year of the research period, in the spring, the amount of humus in the soil was equal to 0.640 as a percentage of the total weight of the soil.

This amount of soil humus indicates that the soil fertility of the Republic of Karakalpakstan is low. In the first year of the experiment, the amount of soil humus at the end of the period was equal to 0.620 and decreased by 0.020% during the period from spring to autumn.

From the end of the period of the first year of the study to the beginning of the period of the second year of the experiment, it was observed that the amount of soil humus increased by 0.06% due to the influence of the roots and shoots left by the wheat crop in the period of autumn-winter and early spring, which mixed with the soil and rotted and benefited from the humus. The reason is that the amount of root and stem residues left behind in the sesame crop is average and the coefficient of conversion to humus is high (0.012-0.013).In the second year of the research, the amount of humus in the soil was equal to 0.626% in the beginning of the operation period, and during the operation period it decreased to 0.616%, and the amount of humus used for biomass accumulation was 0.010%.In the third year of the study, the amount of humus in the soil was equal to 0.631%, and the amount of humus decreased. At the end of the experiment, the amount of soil humus decreased by 0.627%. In order to collect sesame biomass for three years for sesame care - from the spring of the first year of the study to the fall of the last year

Journal Zone Publishing, Ilford, United Kingdom

of the study, the dynamics of soil humus change changed from 0.640 to 0.627, the difference was -0.013%.

In the seventh variant of the experiment, where millet was planted, the amount of humus in the soil at the beginning of the first year of the research period, in the spring, was equal to 0.636 as a percentage of the total weight of the soil. This amount of humus in the soil shows that the soil fertility of the plot of land we experimented with in the Republic of Karakalpakstan is low. In the first year of the experiment, the amount of soil humus at the end of the period was equal to 0.620 and decreased by 0.016% during the period from spring to autumn.

From the end of the period of the first year of the study to the beginning of the period of the second year of the experiment, it was observed that the amount of soil humus increased by 0.07% due to the influence of the root and stem residues left by the millet crop in the period of autumn-winter and early spring, mixed with the soil and rotting, and using the humus.

In the biological characteristics of the millet crop, in addition to the removal of nutrients from the soil, there is a slight or slight increase in the amount of soil humus, close to the previous state, due to the fact that there are enough residual root and shoot residues and the humus conversion coefficient is average (0.013-0.014).In the second year of the study, the amount of humus in the soil was equal to 0.627% at the beginning of the operation period, and during the operation period it decreased to 0.619%, and the amount of humus used for biomass accumulation was equal to 0.008%.In the third year of the research, the amount of humus in the soil was equal to 0.633%, and the amount of humus decreased. At the end of the experiment, the amount of soil humus decreased by 0.623%. In order to collect sesame biomass for three years of growing and maintaining millet, from the spring of the first year of the study to the fall of the last year of the study, the dynamics of soil humus changed from 0.636 to 0.623, the difference was -0.013%.In the eighth variant of the experiment, in which alfalfa was planted, at the beginning of the first year of the study period, in the spring, the amount of humus in the soil was equal to 0.635 as a percentage of the total weight of the soil. In the first year of the experiment, the amount of soil humus at the end of the period was equal to 0.628 and decreased by 0.007% during the period from spring to autumn.

From the end of the period of the first year of the study to the beginning of the period of the second year of the experiment, it was observed that the amount of soil humus increased by 0.19% due to the influence of the root and stem residues left by the millet crop in the period of autumn-winter and early spring, mixing with the soil and rotting and benefiting from the humus.

In the biological characteristics of alfalfa plant, along with the removal of nutrients from the soil, the amount of soil humus increased close to the previous state, due to the fact that the biomass of the root and shoot residues left behind was high and the humus conversion coefficient was equal to the average (0.025).In the second year of the study, the amount of humus in the soil was equal to 0.647% and increased to 0.679% during the period of operation.In the third year of the study, the amount of humus in the soil

Journal Zone Publishing, Ilford, United Kingdom

was equal to 0.711%, and the amount of humus decreased. At the end of the experiment, the amount of soil humus decreased by 0.718%.

In order to collect alfalfa biomass for three years to grow and care for alfalfa - from the spring of the first year of the study to the fall of the last year of the study, the dynamics of soil humus change changed from 0.635 to 0.718, and the growth rate of humus was equal to -0.083%.In the ninth variant of the experiment, where mash crops were planted, at the beginning of the first year of the study period, the amount of humus in the soil was equal to 0.634 as a percentage of the total weight of the soil. In the first year of the experiment, the amount of soil humus at the end of the period was equal to 0.608 and decreased by 0.026% during the period from spring to autumn.

From the end of the operational period of the first year of the study to the beginning of the operational period of the second year of the experiment, it was observed that the amount of soil humus increased by 0.22% due to the influence of the root and root residues left by the moose crop in the autumn-winter and autumn-winter-early spring periods, mixed with the soil and rotting, and using the humus. In the biological characteristics of the mosh plant, in addition to the removal of nutrients from the soil, a slight increase in the amount of soil humus was observed, due to the fact that the biomass of the roots and shoots left behind was high and the humus conversion coefficient was equal to the average (0.013).In the second year of the study, the amount of humus in the soil was equal to 0.630% at the beginning of the operation period, and during the operation period it decreased to 0.606% due to harvesting and natural losses.In the third year of the research, the amount of humus in the soil was equal to 0.642%, and the amount of humus decreased.

At the end of the experiment, the amount of soil humus changed by 0.639%.

In order to collect moss biomass for growing and maintaining moss for three years - from the spring of the first year of the study to the fall of the last year of the study, the dynamics of soil humus change changed from 0.634 to 0.639, and the growth rate was equal to +0.005%.

In the tenth variant of the experiment, in which the bean crop was planted, the amount of humus in the soil at the beginning of the first year of the research period, in the spring, was equal to 0.634 as a percentage of the total weight of the soil.

In the first year of the experiment, the amount of soil humus at the end of the period was equal to 0.608 and decreased by 0.026% during the period from spring to autumn.

From the end of the operational period of the first year of the study to the beginning of the operational period of the second year of the experiment, it was observed that the amount of soil humus increased by 0.22% due to the influence of the root and root residues left by the moose crop in the autumn-winter and autumn-winter-early spring periods, mixed with the soil and rotting, and using the humus.

In the biological characteristics of the mosh plant, in addition to the removal of nutrients from the soil, a slight increase in the amount of soil humus was observed, due to the fact that the biomass of the roots and shoots left behind was high and the humus conversion coefficient was equal to the average (0.013).

Journal Zone Publishing, Ilford, United Kingdom

In the second year of the study, the amount of humus in the soil was equal to 0.630% at the beginning of the operation period, and it decreased to 0.606% due to harvesting and natural losses during the operation period.

In the third year of the research, the amount of humus in the soil was equal to 0.648%, and the amount of humus increased.

At the end of the experiment, the amount of soil humus changed by 0.638%.

In order to collect moss biomass for three years of growing and maintaining moss, from the spring of the first year of the study to the fall of the last year of the study, the dynamics of soil humus change changed from 0.635 to 0.638, and the growth rate was equal to +0.003%.

In conclusion, we can say that in the conditions of saline soil and water shortage of the Republic of Karakalpakstan, in order to keep the land in active use, to get the planned harvest from agricultural crops, and to maintain and increase the amount of soil humus, which is the main essence of soil fertility, it is necessary to plant the above-mentioned crops and give appropriate researched methods to maintain the balance of soil fertility.

Conclusions

1. It is desirable to recultivate unused lands.
2. After recultivation, the amount of soil humus decreased by -0.163% compared to the spring of the first year of the study compared to the fall of the last year of the study.
3. When the land was put into active use through recultivation and sorghum was planted, the amount of soil humus decreased by -0.135% compared to the autumn of the last year of the study, from the spring of the first year of the study.

The reason is that the amount of organic matter taken out with biomass in sorghum is high, and the amount of root and shoot mass left in the soil is relatively high.

4. The results obtained from the control option confirmed that the amount of humus in the soil slowly decreased after the land was re-actively used, and then the crop was not planted.

That is, from the spring of the first year of the study to the autumn of the last year of the study, the amount of soil humus in the control option decreased by -0.135.

5. In the experimentally tested wheat, sesame, millet, mash, and beans varieties, input and output of soil humus was reduced by 0.003-0.013%.
6. Scientific studies prove that planting alfalfa is highly effective for land recultivation or maintaining and increasing soil fertility.
7. Recultivation of abandoned lands for re-use and then planting of alfalfa, millet, wheat, mung beans, beans, sesame almost completely replaces the removed biomass, and it has been proven in scientific experiments that it is economically efficient to plant agricultural crops.
8. It is advisable to give gung and 300 kg of ammophos in the amount of 30 t/ha to the recultivated lands in order to effectively use the land and maintain the soil humus when planting sorghum and sorghum, as well as to obtain the planned high yield.

Journal Zone Publishing, Ilford, United Kingdom

References

1.Reimov N.B., Utepbergenova V.M., Reymov Ó.N., Xudaybergenova N.B., Reymova F.N. Issues of efficient land use in Karakalpakistańs water shortage. // Jurnal of agrikulture ahd biological scicens. Cite faktor. Barselona. Spayn. Volume 3, Issue 2, February – 2025 ISSN (E): 2938-3781. 42-52pp.

2.Reymov O.N., Reimov N.B. Yerlarni rekul'tivaysiyalashning ahamiyati va tuproq unumdorligiga tasiri.// Progress annals/ Jurnal of Progresive Researsh. Vol.2.Ussue 7, July 2024. ISSN (E): 2810-6466. Website: https://academiaone.org/index.php/8.

3.Reymov O.N., Reimov N.B. Yerlarni rekul`tivaciyalashning ekinlar hosildorligi, tuproq unumdorligi va iqtisodiy samaradorlikga tasiri.//Impakfaktorli jurnal.Italiy. Proceedings of International Educators Conference.2024 Open Access/Peer Reviewed | Conference Proceedings/ Monthly ISSN (E): 2835-396X. Vol.3, Issue 6 SJIF 2024: 6.659. 25th June, 2024263-267 rr.

4.Reymov O.N., Reimov N.B. Effektivnoe ispolzovanie zemel v malovodnix i na zasolennix pochvax Respubliki Karakalpakstan.// Qishloq xo'jaligi axborotnomasi Tom 1 № 1 (2024): 2024-1. Qaraqalpaqstan awıl xojalıg'ı hám agrotexnologiyalar instituti. https://journal.tdaunukus.uz/index. php/science/ issue/view/2024-1. 45-46 betlar.

5.Reimov N.B., Zabidullaeva R.K., Reymov O.N. Qoraqalpog'istonda degradatsiyalangan yerlarni rekultivatsiyalashning ahamiyati. Xorazm Ma`mun akademiyasi axborotnomasi: ilmiy jurnal.-№8/1 (105), 2023 y. 150-152 shi betlar.

6.Reimov N.B., Kdirbaeva G.U. Issues of agricultural specialization and improvement of crops agrotechnology in the Aral sea region. Epra international journal of «Research & development». Sjif impact factor 2021: 8.013| isi i.f.value:1.241| journal doi: 10.36713/. (ijrd). 24-12-2021. 147-148 pp.

7.Reimov O.N., Reimov N.B. Rekul`tivaciyalaw jumıslarında jerlerdi lazerli tegislewdiń a'hmiyeti. //«Awıl xojalıǵında insanǵa itibar hám sapalı bilimlendiriwdegi imkaniyatlar hám jańalıqlar» atamasındaǵı Respublikalıq ilimiy-ámeliy konferenciya materialları. 11 dekabr` 2023. Nukus sh.14-16 b.

Journal Zone Publishing, Ilford, United Kingdom