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IMPACT OF LEGUME CROPS ON THE AGROCHEMICAL AND AGROPHYSICAL PROPERTIES OF SOIL IN MIRZACHOL CONDITIONS

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Abstract

The article provides information on the effects of crops on key agrochemical parameters of soil.Before and after cultivation ofcrops they were studied and compared.The experiments were performed in three steps.The first stage investigated the effect of pea plants on soil properties by planting them in two terms.The second stage investigates the role of esparcet, alfalfa, and quince in soil fertility.In the third stage, the effects of variants planted with sudan grass, alfalfa and sudan grass with alfalfa on the agrochemical properties of the soil were studied.According to the study, alfalfa was important in increasing the amount of humus in the soil.Compared to the baseline figures, the amount of humus increased by up to 25 percent during the cultivation.It has been established that vica plants play a role in making phosphorus in soil more mobile.

Keywords:vica, sudan grass, peas, esparcet, alfalfa, mechanical composition of soil, humus, nitrogen, phosphorus, potassium, aqueous suction, soil salinity, bulk weight, porosity, crops, intermediate crops, repeated crops.

I. Introduction

There are many factors affecting soil fertility and crop productivity.These include the use of mineral and organic fertilizers, eliminating soil degradation, combating soil erosion and salinization, and introducing crop rotation and rotation.As its known, the yield on the 50 percent of the expense of fertilizers (mineral and organic).Under these conditions, if crop rotation is introduced, it will produce better and better yields.

As a result of crop rotation not only improves soil fertility, it also provides the population with food, especially protein-rich products.It can also be used as fodder for livestock.These include legumes, cereals, grains and vegetables, and can be used as secondary or intermediate crops.The introduction of these crops into the crop rotation will not only affect the soil's organic composition but also improve its physical properties.

Seeds such as soybeans, beans and moss are planted twice a year in early spring and mid-summer.These crops will, first and foremost, improve soil fertility and, secondly, provide the population with valuable protein-rich foods and animal feed.

A.N. Babichev, V.A. Monastyrsky [3; 88-90 pp.]recommended planting a variety of cider crops to increase soil fertility. They noted that many years of lupine are distinguished by accumulation of biological nitrogen.This crop is well developed on sandy, sandy gilt and even sandy soils and accumulates 350-380 kg / ha of biological nitrogen annually.

D.Yu. Popov [16; 3-4 b] considers soil-climatic conditions to be considered when selecting intermediate crops.It is important to note that the southern regions are provided with moisture.In the northern regions, harvesting of intermediate crops often depends on the duration of hot days.Consequently, hot, drought-resistant crops are cultivated in the southern regions, and in the northern regions low-heat, fast-growing crops.

When planting intermediate crops, weeds are lost due to additional soil processing.Intermediate crops have been shown to reduce weeds by 35-50%.

A.A. Mushinsky, NI Mushinskaya, O.A. Dorokhin [12; 231-234 pp] studied the effects of alfa alfa and Sudan grass on agrochemical and agrophysical properties of soil.At the same time there was a decrease in soil weight, structural increase in soil size and porosity.In addition, nitrogen, phosphorus and potassium also increased significantly.

According to L.D Frolova, M.N Novikov [21; 322-325 pp] perennial grasses improved the physical properties of soil, increased water-resistant aggregate by 20%.Increased nitrogen accumulation, had a positive effect on the active forms of phosphorus, but there was a decrease in potassium balance.

B.M.Kholikov et al [23; 117-119 pp]. It has been established that every agrotechnical activity carried out in the fields, where cotton is continuously cultivated for many years, has a dramatic effect on the physical properties of the soil, as well as on the mass, as compared with other experiments.

According to A. Khamraev, [29; 40-41 pp] when fertilizer is fully expelled from the soil as a nutrient, first, the biological mass for the soil is the only biomaterial that produces humus, and secondly, it acts as an organic fertilizer to prevent erosion and increase nutrients in the soil.Fertilized barley, as a green fertilizer, increased soil fertility when weeded water, and weeds decreased by 31% compared to control, with the growth and development of potatoes and the increase in the weight of the bush.

Perennial and annual legume crops to increase soil fertility, irrigated vegetables and potatoes in irrigated agriculture throughout the country:Alfalfa, green peas, peas, autumn vica, lupine, winter barley, winter rye, oats, ray grass,bersim, autumn surepka, rape, oil radish, mustard, perko, etc.

Studies show that in our country, green fertilizers are superior to local fertilizers in terms of their impact on crop yields.

According to A. Iminov, B. Halikov [8; 40-41 pp] legumes and grains are considered to be of agrotechnical value and collect biological nitrogen and organic matter in the soil.These crops accumulate 50–100 kg / ha of biological nitrogen in the soil during the growing season in the cultivated area.Some crops may be even more.For example, green peas can contain up to 150 kg of biological nitrogen per hectare and up to 250 kg.Increased accumulation of biological nitrogen ensures higher yields of these crops and their subsequent crops.

M.N. Novikov, V.N. Barinov [14; 343] experimentally found that mixing oats with vica is more effective than sowing with lupine.Experiments have shown that sowing legumes with other crops is also important in maintaining potassium balance.Mixing of intermediate crops rather than individual crops is also important for improving the soil humus status.

According to T.F. Jarova [6; 62 pp.] experimentthe 1.5-fold improvement of soil aggregate and water resistance is studied bycultivation.When cereal crops were used, the loss of organic matter was reduced, with the amount of humus increasing from 3.36% to 4.2%.It is closely connected with the soil residues in the soil. B.
Kholikov and F. Namozov [23, 83-84 pp] found that crop rotation positively influenced the agrophysical properties of the soil.

Positive changes have been observed in crop rotation of cotton, winter wheat and secondary crops during crop rotation.The initial soil mass in the study area was 1,32 g / cm^3 in a 0-30 cm layer.At the end of the period of cultivation the cotton mass increased by 0,03-0,05 g / cm^3 compared to the baseline, whereas in winter wheat variants, these values were found to be less (0,02 g / cm^3).

V. A. Shadskix, V.E Kijaeva, L.G Romanova, A.L Rasskazova [26; 166-183] studied the effects of different crops on the agrophysical and agrochemical properties of the soil.In Vika + oats and soybean variants, the soil density is close to optimal, 1,16 g / cm^3. The highest volume was observed in areas with 1,39 g / cm3 alfalfa planted.This is due to the fact that in each harvest, the soil is compacted as a result of the technique.

I.F Kargin, A.A Zubarev, N.N Ivanova [10; 102-105] have found that humus content in the cultivated and sub-soil layers of perennial grasses is higher than for potato cultivation.When potatoes are grown, humus content is low, due to the small amount of root residues and their rapid decay.As a result of the cultivation of potatoes in water for a long time will be 20-50 sm depth, the density of the soil layer,this worsens the physical properties of these soils and reduces the potential for oxidation.Under the influence of perennial grasses, the density in the 0-50 sm layer decreased by 0.07–0.21 g / sm^3, and the overall porosity increased by 3–8%.

Many scientists have done research on the effects of intermediate, repeated and sider crops on soil fertility.In particular, H.F. Batirov, R.N. Abdumuminova [5; 128-132 pp], A.N Babichev, G. T. Balakai, V.A Monastyrsky [4; 98-112 pp], N.P. Melihova, A.A. Zibarov, D.S Tegesov [11; 36-39 b], N.B. Usipbaev [21; 6-9 pp], A.A. Kapeev [9; 46-47 pp], V. K. Singh, B. B. Sharma, B. S. Dwivedi [31; 405-412 b], A. Marcinkeviciene V. Boguzas S. Balnyte R. Pupaliene R. Velicka [30; 198–203 pp].

However, on the basis of the obtained data, the effect of agrochemical and agrophysical properties of soil on different crops for different periods in Mirzachul valey has not been studied for many years.Therefore, the topic we have chosen is considered to be relevant.

The following are the results of the experiments conducted in the Mirzachul valey for 2004-2019 to study the impact of different crops on soil fertility.

II. The method of experimentation.

Specific experiments were performed to study the effects of crops on soil fertility.The study area corresponds to the soils region according to soil-climatic materials.It is located in the zone of light gray soils by its height.These soils are located in the lowest part of the steep soil zone.In recent years, soil formation and soil formation processes have been affected by the economic activity of groundwater and human in some areas.As a result, passing through intermediate soil in more common.From irrigated sandy soils weeds, meadow-gray soils, and later irrigated meadow soils are formed.This evolution of soils, of course, affects the properties and features of soils.

As noted by R. Kuziev, N.Abdurakhmonov, U.Sobitov [28; 88-89 b] Changes, salinity, low structure and porosity of the Myrzachul beds determine their water permeability.Medium sandy, moderately saline grassy soils with long time irrigated soil, characterized by high water permeability from lightly sandy, poorly saline meadow soils.

The average altitude of Mirzachul is 250-300 m above sea level, and the highest is in the southeast, near the beginning of the irrigation canals and its height is 350 m.The lowest area of marshes and saltwater in the northwest, that is, Mirzachul, is 230 m above sea level.The Mirzachul Plain descends to the north and north to the west.The moisture content in the distribution of moisture and salts in the soil is particularly important in the condition of Mirzachul.

By its geographical location, Mirzachul is characterized by extremely low groundwater flow rates, which in turn contributes to the development of salinization processes.Therefore, all the soils in this area are almost saline, and the high costs can help maintain these lands in a reclamative state.

In the experiment volume mass of soil determined by metal sylindre, mechanical and micro agregate content determined by N.A.Kachinsky method, decomposers (humus) contentent of the soil by I.V. Tyurin method, general nitrogen in soil by Keildal method, general phosphorous by I.M Maltseva, general potasium simmit content by L.P.Gritsenco, nitrogen’s nitrite form in 1% carbon ammonium absorbtion of active phosphor and potassium by Grandvald-lajou method, compared mass determined in picnometr method in 0-30; 30-50 smlayers.

In the article are shown experiment results of peas in 2004-2008, alfa-alfa, esparset and vika plants in 2012-2014, and sudan grass and alfa-alfa in 2019. In order to define change in agrochemical features of the soil while these feeder crops analysis of the soil samples were done before planting and after harvest.

III. Results and discussions

In 2004-2008on agro fields of 1- Boyavut subdistrict of Boyvut district of Syrdarya regionat the scientific experimental station of Research Institute of Grain and Leguminous Cropsfield experiments were conducted to study the effects of peas on soil properties in autumn and spring.For this purpose, soil samples were analyzed both before and after harvesting pea fields.

The soils of the experimental farm are located in areas where light-brown soils are scattered and consist of old-watered meadow soils.The soil by its mechanical composition is composed of light loams.

in experiments Uzbekistan-32 (control) and chosen varieties as productive Asilbek, MirOz, FLIP98-152c, Halima varieties were selected in the autumn and spring seasons in 60x10x1, 60x15x1, 60x20x1 scales.

The number of variants at each planting time was 15 and tested at 4 repetitions.The number of is parts 60.The total area of each part is 48 m^2, with a calculated area of 24 m^2, and the location of the squares is systematically arranged in 4 levels.

Numerous literature sources provide information on the positive impact of Fadaceae, Leguminosae on the physical and chemical properties of soils.There has been little research on the nitrogen fixation in the field and the influence of humus and other nutrients on the field conditions by Fadaceae Leguminosae.

One of the most important biological features of peas is that they can be sown as the main and intermediate crop and improve soil fertility.According to the results of research and implementation in soil and climatic conditions of Uzbekistan, peas can produce 2.5-3 tons of grain per hectare and 300-350 ts of green straw and fodder.In Southeast Asia, pea grains still produce a wide variety of foods production and blue stem is a nutritious feed in poultry and livestock.

Pea plants are also one of the oldest crops that play a vital role in meeting the population's demand for quality biological protein and macronutrients.Peas are the third in the world for beans in terms of size and area of cultivation, and the first for their nutritional value and protein absorption.Legumes play an important role in the mobilization of nutrients in the soil and in their increase [9; 46-47 p].

At present the farms of the Republic do not use the large amount of peas in irrigated land because of the lack of land resources as a result of the widespread introduction of the cotton-grain crop rotation system, the absence of new high yield varieties of peas and no technology for their cultivation.

As noted above, the soil of the experimental area is light sandy, with 35 to 40% of the mechanical composition dominating large dust particles (0,05-0,01 mm) (Table 1).

Table 1.
Mechanical composition of soil of 1 Boyavut farm

Cross section №	Depth, sm	The amount of particles,%							
		>0,25	0,25-0,1	0,1-0,05	0.05-0,01	0,01-0,005	0,005-0,001	<0,001	Physical clay
1	0-30	0,5	1,5	23,8	46,9	6,7	11,0	9,6	27,3
	30-50	1,0	1,5	35,5	32,1	14,5	3,3	12,1	29,9
2	0-30	1,0	2,5	42,1	27,1	6,4	10,0	10,9	27,3
	30-50	0,5	1,0	43,3	28,5	5,0	11,1	10,6	26,7

Two cross-sectional data were presented in order to elucidate the soil properties and features and the changes under impact of pea plants.In 1, sample of pea planted in the autumn period, and In 2 sample pea planted in spring are shown.

It is clear from Table 1 that,In the upper layers of section 1, the content of large dust particles was 47%, while in the lower layers it decreased to 35%.
In cross-section 2, large dust particles are almost evenly distributedand consist 24-27 percent.The particles greater than 0.25 mm are only 0.5-1.0%.The amount of physical mud is less than 30%.Most scientific sources have shown that light sandy soils are the best mechanical soils for pea plants[15; 46-47 p].Therefore, the mechanical properties of the soil tested are in agreement with the authors described above.

The soil's mechanical composition is less variable andis one of the key indicators of agro-technical measures such as crop placement, irrigation, fertilization and planting depth.

The experimental field soils are weakly saline (table 2), with dry residue less than 1% in both experimental areas.The amount of dry residue decreased down to 0,290-0,250%.The total alkalinity is 0,030-0,033%, which corresponds to the low alkalinity of the soil in the area.The amount of chlorine in the soil often exceeds the toxicity threshold and in some cases to 0,036%.

The analysis of the water absorption was conducted according to the method developed by the Uzbek Research Institute of Agrotechnology of Cotton Breeding, Seeding and Breeding.

Table 2

Analysis of water absorption of soils of the experimental area,% .

Depth, sm	Dry residue	HCO_3	Cl	SO_4	Ca	Mg	Na
The area of winter term peas							
0-30	0,311	0,031	0,036	0,130	0,042	0,009	0,032
30-50	0,290	0,033	0,028	0,120	0,025	0,009	0,042
The area of spring term peas							
0-30	0,313	0,32	0,030	0,134	0,035	0,004	0,047
30-50	0,250	0,030	0,024	0,111	0,025	0,006	0,040

Chlorine is considered to be dangerous in terms of its effects on plants, as chlorine is an anion that moves rapidly in soil and plants.

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Calcium is the prevailing cation, given the cation in the water absorption.In some cases the sodium content reaches 0,047%.The amount of sulfates in water absorption is 0,130-0,134%, with the highest content in the upper layer.On the downside, you can see a slight decrease in the amount.

Special observations were made to determine the agrochemical properties of the soil in the cultivation of pea plants.To do this, soil samples were analyzed before sowing and harvesting of pea fields in the fall and spring periods.Given the data in Table 2, the difference in the amount of humus in the soil before sowing and harvesting was maintained at both times.This indicates low variability in the amount of humus.

The amount of total nitrogen can be seen to have changed.This is especially can be seen in the spring harvest of peas.At the depth of 30-50 sm before sowing in the autumn period the total nitrogen content was 0,018%, and after harvesting this figure was 0,059%.

There is a decrease in total phosphorus content after harvest.On the contrary, the amount of mobile phosphorus increased.This figure showed an increase in both periods.

Suleymanov SM and others also note that legumes have a very important role in improving soil fertility, production of protein-rich products, and mobilization of hard-absorbing phosphates in the soil [19; 29-31 p].

In terms of total and active potassium, the pea crop planted in both periods showed little change in the results.

Our next research work in 2012-2014 was conducted on a pilot site in the Gulistan State University based on a research project on the study of the phytomelioration of saline soils of the Mirzachul valey in the desertification process.

The experimental area was conducted on old irrigated meadow, weak saline and light sands with mechanical composition.

The expected outcome of the phytomelioration activities in our research is to improve soil structure with the aggravation of agrophysical and chemical properties during desertification, and to create sustainable agrofitocenoses in the area, The study analyzed soil samples before sowing and harvesting in order to investigate the effect of selected plants on the soil properties as they are representative of the Fadaceae Leguminosae.

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Table 3
Agrochemical indicators of soil

Cross section	Depth, cm	Humus, %		N,%		General, %				Mobile, mg / kg					
						P_2O_5		K_2O		$N\text{-}NO_3$		P_2O_5		K_2O	
		Before planting	After harvesting	1	2	1	2	1	2	1	2	1	2	1	2
Autumn term	0-30	0,98	0,95	0,043	0,068	0,45	0,24	1,43	1,21	15,7	17,9	13,59	23,0	286	229,3
	30-50	0,59	0,57	0,018	0,059	0,45	0,28	0,9	1,2	10,2	15,1	7,15	14,3	210	280
Spring term	0-30	0,97	0,97	0,034	0,068	0,53	0,26	1,29	1,37	20,4	24,2	12,0	20,9	236	290
	30-50	0,54	0,54	0,029	0,050	0,43	0,25	1,10	1,5	12,2	19,1	10,5	12,1	210	95

Note: 1-Before sowing peas, after the 2-nd pea harvest

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Representatives of the Fabaceae family for the selection of salt-resistant, productive and promising forage species and varieties from local flora and introductory species: *Medicago sativa, Onobrychis transcaucasica, Crotallaria alata, Vicia angistifolia, Galega officinalis, Melilotus albus* Desr. and*Melilotus officinalis* (L.) Pall.; from*AsreraceaeGuizotia abissinica* species were planted and studied.

The Medicago sativa (green alfalfa) was sown in the experimental field in the spring at the rate of 600 seeds per 1 m^2, and the remaining plants 50 seeds per 1 sq.m.The number of variants in the experiment was 8 and was repeated in 4 repetitions.There are 32 parts.The total area of each variant is 40 m^2, with a calculated area of 20 m^2, which is 20 meters long and 2 meters wide.The surface of one variant was 160 m^2 in 4 repetitions, and eight variant surfaces were 640 m^2 at 4 repetitions.

The first two or two years of experiments were carried out on the production of Medicago sativa (alfalfa) and Onobrychis transcaucasica (espartset) and Vicia angistifolia (vica), which were selected as positive indicators.

Alfalfa is also important as a meliorative plant, as the salt content in alfalfa land is reduced, This is due to the fact that the alfalfa is sown thickly due to the significant reduction in evaporation from the soil, some of the salt being lost through the harvest, the washing of salts when the alfalfa is watered, and the ground water does not rise due to the use of water in the deep roots of the alfalfa.

According to the Scientific Research Institute of Cotton selection Crop Breeding, Seeding and Farming Agrotechnology, When cotton is planted on fields after alfa alfa, it is less susceptible to scabies.Alfalfa also plays an important role in the cultivation of irrigated cultural pastures, because alfalfa is certainly a complement to the herbs.

O.A. Abanina [1; 3-10 b] has developed a method for improving the agrophysical properties of ordinary black soils by planting espartset.At the same time, improvement of the structural aggregate level of soil, lightening of soil volume, improvement of water and physical properties of soil were observed.The porosity in the 0–10 sm layer of soil increased to 0,29–3,66%.

Vica improves soil properties.Changes soil permeability, structure, air and moisture content.Protects the soil from water and wind erosion.Because it fully covers the soil surface, prevent weeds from developing and prevent moisture from evaporation from the soil, which is important in preventing soil salinization.There are also phytosanitary qualities of the vica.Soil microorganisms and worms improve their livelihoods, and decomposition is a key nutrient for them.This in turn reduces plant morbidity and increases soil fertility.

The following are the effects of the above crops on soil salts.

Table 4.

Analysis of water absorptionof soils of the experimental area,% (before sowing)

№	**Soil horizon, sm**	**The level of salinity**							
		Dry residue,%	**HCO^-_3**	**Cl^-**	**SO^{-2}_4**	**Ca^{+2}**	**Mg^{+2}**	**Na^++K^+**	**The sum of salt ions, %**
K-1	**0-30**	0,669	0,064	0,079	0,306	0,108	0,033	0,036	0,627
	30-50	0,586	0,066	0,066	0,260	0,083	0,021	0,058	0,554
K-2	**0-30**	0,595	0,053	0,076	0,277	0,086	0,029	0,046	0,548
	30-50	0,426	0,0433	0,0388	0,2098	0,0695	0,0115	0,0405	0,413
K-3	**0-30**	0,674	0,062	0,074	0,310	0,109	0,035	0,038	0,628
	30-50	0,590	0,068	0,071	0,258	0,083	0,024	0,059	0,563

Note: K-1 Espartset sowing area (III. 2013)
K-2, 2012, the area planted alfalfa (III).
K-3- Vica sowing area (2014 III)

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Table 5.
Analysis of water absorptionof soils of the experimental area,% (before sowing)

№	Soil horizon, sm	The level of salinity							
		Dry residue,%	HCO^{-}_{3}	Cl^{-}	SO^{-2}_{4}	Ca^{+2}	Mg^{+2}	$Na^{+}+K^{+}$	The sum of salt ions, %
К-1	0-30	0,669	0,064	0,079	0,306	0,108	0,033	0,036	0,627
	30-50	0,586	0,066	0,066	0,260	0,083	0,021	0,058	0,554
К-2	0-30	0,595	0,053	0,076	0,277	0,086	0,029	0,046	0,548
	30-50	0,426	0,0433	0,0388	0,2098	0,0695	0,0115	0,0405	0,413
К-3	0-30	0,674	0,062	0,074	0,310	0,109	0,035	0,038	0,628
	30-50	0,590	0,068	0,071	0,258	0,083	0,024	0,059	0,563

Note: K-1 Espartset sowing area (III. 2013)
K-2, 2012, the area planted alfalfa (III).
K-3- Vica sowing area (2014 III)

Comparing the data of the two tables, we can observe a decrease in the dry soil residue after planting at the depth of 0–30 sm in all three sections.However, compared to other crops, alfalfa crop yields have been reduced by up to 40% after sowing.In Espartset this figure was 10% and in the vicinity was 8%.Chlorine anion is the leader in plant toxicity.After cultivation of chlorine ion crops, we can see that in the esparcet this decrease was 60%, 21% in alfalfa and almost unchanged in vica.

We can see the opposite results for the sulfate ion data above.In comparison with the initial indication, the sulphate ions did not change or even slightly increased in the areas planted with esparcet.In the post alfa alfa data, this figure dropped to 62 percent, while in the vica area it was 6 percent.

The alkaline data is close to the data above.As a result of the analysis of aquatic sorption obtained before and after planting, esparcet, alfalfa, and vica have a role in reducing salts, but their effect on salts content is different in different crops.

Table 6.

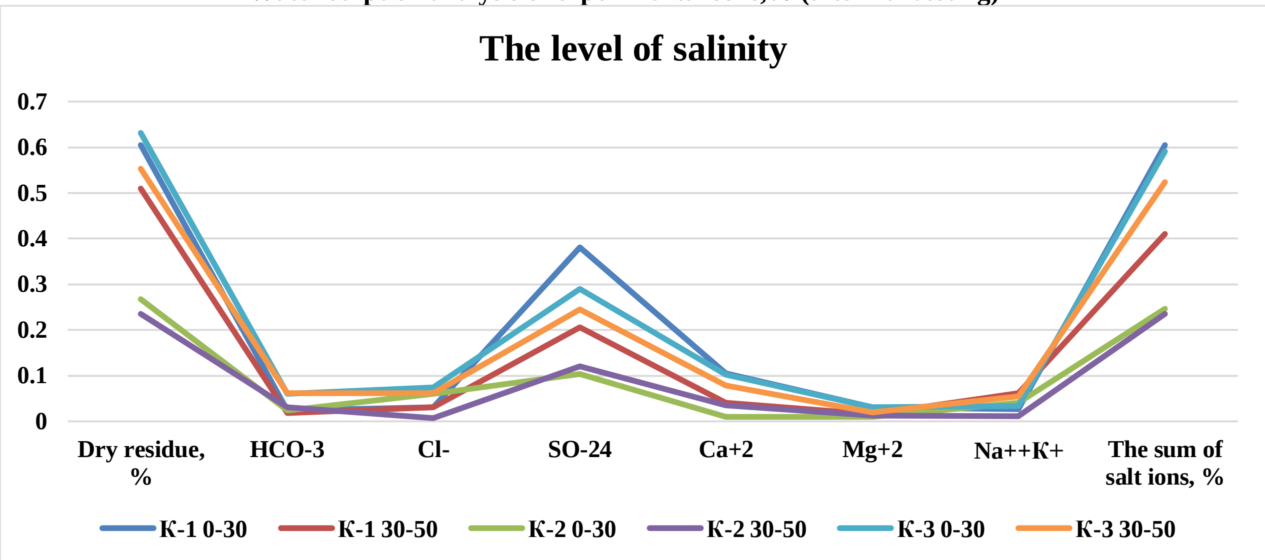
Water sorption analysis of experimental soils,% (after harvesting)

№	Soil horizon, sm	The level of salinity							
		Dry residue,%	HCO^-_3	Cl^-	SO^{-2}_4	Ca^{+2}	Mg^{+2}	Na^++K^+	The sum of salt ions,%
К-1	**0-30**	0,605	0,024	0,031	0,381	0,105	0,03	0,027	0,605
	30-50	0,510	0,018	0,031	0,206	0,04	0,015	0,061	0,410
К-2	**0-30**	0,268	0,024	0,060	0,103	0,01	0,009	0,041	0,247
	30-50	0,235	0,03	0,007	0,121	0,035	0,012	0,011	0,235
К-3	**0-30**	0,632	0,060	0,074	0,290	0,102	0,031	0,034	0,591
	30-50	0,554	0,062	0,062	0,245	0,078	0,020	0,055	0,524

Note: K-1 -Espartset planted area (2 years)
K-2-alfa alfa Planted area (3 years)
K-3- Vica sowing area (1 year)

diagram1

Water sorption analysis of experimental soils,% (after harvesting)



D.A. Khristenko [25; 20-23 b] noted that after planting perennial herbs such as alfalfa and esparcet, the amount of organic matter in the soil increased to 4.0%.In addition, the soil structure has increased.

E.V. Nedotsuk [13; 10-12] show that the root and root residues are 1,1-3,1 times higher than those of other grasses in the area where espartset is planted.Similar indicators are observed in micronutrients.On the areas where the Espartset is planted, the degree of aggregation and structural position are good.

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Alfalfa also has an agricultural engineering role.Land released from alfalfa is the best pasture for other plants, as perennial alfalfa 1 contains 250-340 kg of nitrogen and 150-184 kg of root residues.In the soil, humus is increased to 1,58%.

When used as a green fertilizer, the vica after the decomposition of biomass in the soil becomes more easily absorbed, the soil becomes rich in organic humus.It collects nitrogen from the air and enriches the soil with nitrogen at the expense of tuberculosis bacteria that develop in the roots.Nitrogen is a good substitute for demanding crops.

Table 7.

Mechanical composition of soil(after harvesting)

№ Cross section	Depth, cm	The amount of particles,%							
		>0,25	0,25-0,1	0,1-0,05	0.05-0,01	0,01-0,005	0,005-0,001	<0,001	Physical clay
K-1	0-30	4,8	1,2	27,5	35,6	9,9	11,6	9,4	30,6
	30-50	4,0	1,0	11,1	49,5	5,9	16,8	11,7	34,4
K-2	0-30	1,6	0,4	6,0	49,6	10,8	19,9	11,7	42,4
	30-50	2,8	0,7	8,9	47,7	8,7	18,8	12,4	39,9
K-3	0-30	1,0	0,2	23,2	42,2	16,4	7,6	9,4	33,4
	30-50	0,3	0,9	19,0	38,6	14,1	16,0	11,1	41,20

Note: K-1 - Espartset planted area (2nd year), K-2 - alfa alfa planted Area (3rd year), K-3- Vica sowing area (1 year)

Considering the mechanical composition of the soil, it is mainly composed of medium sandy loam,The size of the particles is dominated by large dust particles, which are typical of all sandy soils.

Table 8

The amount of spring (pre-experimental) gross nutrients of the experimental area soil (in% of 100g of soil)

Cross section	Depth, cm	humus, %	N,%	General, %		Mobile, mg / kg		
				P_2O_5	K_2O	$N\text{-}NO_3$	P_2O_5	K_2O
K-1	0-30	1,107	0,091	0,101	1,257	16,1	11,81	90
	30-50	0,957	0,070	0,081	1,08	14,4	7,13	85
K-2	0-30	0,987	0,072	0,096	1,133	18,6	13,11	112
	30-50	0,537	0,0393	0,061	0,82	12,2	9,22	87
K-3	0-30	1,280	0,222	0,208	1,610	18,9	13,43	113
	30-50	0,746	0,166	0,167	1,086	12,5	9,44	89

Note: K-1 - Espartset Planting Area (III. 2013), K-2 - alfa alfa planted Area (III. 2012), K-3- Vika sowing area (2014)

Table 9.

Agrochemical features of soil (after harvest)

Cross section	Depth, cm	Humus %	N,%	General, %		Mobile, mg / kg		
				P_2O_5	K_2O	$N\text{-}NO_3$	P_2O_5	K_2O
K-1	0-30	1,21	0,213	0,155	1,12	16,6	12,13	98
	30-50	1,0	0,101	0,218	0,80	14,8	7,33	91
K-2	0-30	1,29	0,224	0,210	1,62	23,1	13,46	115

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	30-50	0,76	0,168	0,169	1,1	18,6	9,47	90
K-3	0-30	1,32	0,229	0,215	1,66	19,5	17,79	117
	30-50	0,770	0,172	0,173	1,12	12,9	12,70	92

Note: K-1 - Espartset planted area (2 years)
K-2 - alfa alfa planted Field (3 years)
K-3- Vica sown area (1 year)

One of the most important indicators of crop cultivation is the agrochemical performance of the soil.Comparing the above tables, we can see that there have been some changes in the agrochemical parameters of the soil.In particular, we can see an increase in humus at depths of 0–30 sm and 30–50 sm in all variants.The growth of humus in the 0–30 sm layer on the Espartset planted area was 9%, with alfalfa cultivation up to 25%, and vica 4%.

Positive results were also obtained on total nitrogen.If we look at the soil analysis obtained after esparcet and alfalfa, we can see that the total nitrogen has almost doubled.Changes in total potassium and phosphorus have also been observed, but their effects are negligible.

It is well-known that the stratum utilization of fertilizers takes into account the amount of nutrients in the soil.

Although the amount of nitrogen nitrogen changes in the area under cultivation of esparcet is not high,There is an increase of 20% in the area under alfalfa and 4% in the vica area.

It is known that in the soils the amount of mobile phosphorus is low, the main reason for this is the high probability of calcium phosphate formation in these soils.Therefore, increasing the amount of phosphorus from phosphorus in the reserve remains an urgent problem.Among the aforementioned plants, vica plants were highly active in the formation of phosphorus in soil.Phosphorus levels increased by 25% compared to the first period.

The amount of substitute potassium is relatively well in the soil of Mirzachul valey.This soil is dependent on the native rock.

Recent research results for 2018-2019 as part of a research project "Improving soil fertility using plant resources and improving technology of fodder production for livestock"Field experiments were conducted at the Syrdarya Research Station of the Scientific-Research Institute of Crop Breeding, Seeding and Breeding Agrotechnology to determine the optimal seeding time and harvesting parameters, which ensures high yield of green mass when watered and mixed alfalfa.

As a subject of observation we studied the varieties of grass "Chimbayskaya Jubileynaya", alfalfa "Tashkent-2009".

The experiment was conducted in the field.The number of iterations is 4 and the parts are in 4 levels.The surface of the parts is 15 m^2.Sudan grass and alfalfa were planted in simple rows.15 cm between the rows.Each site was designated a site of 0,25 m^2 in three locations and monitored.

Experimental system

№	Sudan grass, kg / ha	Alfalfa, kg / ha
1	20	-
2	-	16
3	20	16
4	20	12
5	20	8
6	16	16
7	16	12
8	16	8

Soil samples were analyzed before sowing and harvesting to determine if agrochemical properties of the soil could change in the cultivation of these forages.

Our first observations were made in March before sowing.In this field, sudan grass and alfalfa are planted as earl fodder crop.That is, when the chemical and agrochemical elements in the soil were analyzed in March before planting, the humus content was 1,576-1,597% in the 0-30 sm soil layer and the humus content in the 30-50 sm layer was 1,044-1,363%.The total phosphorus content in the deposit layer was 0,19-0,207% and decreased downward, while total potassium was 0,77-0.92%.The amount of active phosphorus and the amount of exchangeable also decreased in the sediment layer (31-43 mg / kg, 293.8-366 mg / kg) (Table 10).

Table 10.

Chemical and agrochemical properties of the experimental field meadow soils (before sowing March 2019)

Variant	Thickness of the layer, cm	Humus %	General, %		N,%	Mobile, mg / kg		N-NO_3,мг/кг	Carbon C, %
			P	K		P_2O_5	K_2O		
1,	0-30	1,576	0,195	0,88	0,091	43,0	308,2	12,4	0,914
	30-50	1,363	0,185	0,84	0,082	25,5	264,9	12,4	0,791
2,	0-30	1,597	0,207	0,92	0,103	43,0	366,0	14,2	1,063
	30-50	1,15	0,17	0,77	0,075	13,5	252,8	14,8	0,667
3,	0-30	1,583	0,19	0,81	0,094	31,0	293,8	11,6	0,926
	30-50	1,044	0,165	0,81	0,067	18,0	240,8	12,6	0,606

Soil agrochemical properties of soil samples were analyzed after harvesting on sudan grass and alfalfa in water and in planted variants Given the data in Table 10, the difference in the amount of humus in the soil before sowing and harvesting was maintained at both times.This indicates low variability in the amount of humus.

The amount of total nitrogen can be seen to have changed.This figure is particularly noticeable in the data obtained after the variant planted with pure alfalfa.At the depth of 30-50 sm before spring planting, the total nitrogen content was 13 mg / kg, and after harvesting it was 25,84 mg / kg, while the sudan grass was pure in both pure and alfalfa varieties (14,6-14,83 mg).

After harvesting, there is a decrease in total and mobile phosphorus content.

Table 11

Chemical and agrochemical properties of wetlands of experimental field(Fodder planted in the spring of September 2019 after harvesting)

Variant	Thickness of layer, cm	Humus, %	NO_3 мг/кг	P_2O_5 мг/кг	K_2O
Sudan grass	0-30	1,353	15,53	27,06	324
	30-50	1,089	14,12	10,8	233
alfaalfa	0-30	1,496	34,3	29,86	262
	30-50	0,946	17,38	6,0	298
Sudan grass+ alfaalfa	0-30	1,597	15,09	23,73	432
	30-50	1,21	14,26	13,46	286

After the harvest of forage crops, there was little change in the total amount of potassium and active potassium.

As can be seen from the data of this table, weeds have a high demand for soil nutrients and higher absorption of nutrients from the soil.This can be illustrated by the example of soil nitrates.That is, the area of nitrates was 15,53-14,12 mg / kg in the area where the sudan grass was planted.In the case of alfalfa, nitrates were 34,3 mg / kg.

Salinization is one of the soil processes that determine the fertility and productivity of irrigated land, land reclamation and agricultural productivity, this process depends on the terrain, geomorphological and lithological structure, soil-climatic and human-economic conditions and a number of other factors.

In the experimental field, soil samples were collected in March in the field, where the fodder crops were sown with sudan grass mixed with alfalfa.

To determine the extent and type of soil salinity, the amount of water-soluble salts in the soils is taken into account.The analysis revealed that the soil under study was subjected to severe salinization.According to the obtained data, the dry residue in the studied soils is 2,332-3,832% according to the soil profile, and the high alkalinity (NSO_3) fluctuates between 0,018-0,024%.In the upper layers there was a change in the amount of chlorine up to 0,012-0,036%, with a slightly higher level of sulfate ions than chlorine, which is around 1,078-1,345%.It was found that the Ca content was 0.208-0?260%, Mg ranged from 0,028-0,066, and Na was about 0,443-0,940%.

The results of the analysis show that there is a high amount of dry residue on the meadow soils irrigated by the experimental field.In these soils, 2,330-2,832%.This indicates moderate to severe salinity of these soils.Salinity type is sulfate-chloride salinity group (Table 12.

Table 12

Water sorption analysis of experimental soil,% (III. 2019)

№	Depth of layer, cm	CI		HCO_3		SO_4		Ca	Mg		Na+K		Dry residue,%
		mg / eq	%	mg / eq	%	mg / eq	%	%	mg / eq	%	mg / eq	%	
1	0-30	0,34	0,012	0,4	0,024	31,2	1,203	0,220	2,3	0,028	20,9	0,483	2,330
	30-50	0,67	0,024	0,4	0,024	45,8	1,204	0,252	3,6	0,044	34,2	0,787	2,322
2	0-30	0,57	0,020	0,4	0,024	43,0	1,078	0,242	3,1	0,038	31,8	0,730	3,144
	30-50	1,03	0,036	0,3	0,018	52,6	1,218	0,260	3,5	0,042	40,9	0,940	2,832
3	0-30	0,57	0,020	0,4	0,024	50,0	1,208	0,208	4,6	0,056	40,5	0,930	2,648
	30-50	1,03	0,036	0,3	0,018	40,5	1,345	0,252	2,7	0,033	29,2	0,670	2,968

IV. Conclusions

All the data obtained after the sowing of different crops and different time periods shows that the soil properties have improved to some extent.However, the agrochemical effects of the soil vary in different crops and differ in spring and autumn periods.After planting pea plants, we can observe that the amount of mobile phosphorus in the soil increased compared to its original condition.The amount of mobile phosphorus in the soil indicates the importance of planting, given the poor availability of soils.Experiments in the second phase have shown that alfalfa is better than other crops in the dry residue while reducing the amount of dry residue.This indicates that the root system of this crop is associated with the reduction of ground water evaporation through the root system and the improvement of microclimate, reducing the evaporation of ground water. Observations on the increase in mobile phosphorus have led to higher rates of vica and a 25% increase compared to the baseline.Our experiments in the third phase have shown that increasing the amount of nitrogen in the soil is better after planting alfalfa itself than planting alfalfa and sudan grass.

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