

Restoration of Degraded Pasture Ecosystems of Dehkanabad Forestry



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ABSTRACT: This article presents the current state of the pasture ecosystems of the foothill and mountain zones, the preservation of their biodiversity and ways to increase the productivity of degraded pastures ensure stable development of animal husbandry, methods of improving degraded pastures through the sowing of long-term drought-resistant forage plants.

KEYWORDS: pastures, ecosystem, yield, degradation, biodiversity, forage plants, grazing.

INTRODUCTION

The prevailing climatic and socio-economic conditions in the pasture land use of the foothill zone are not favorable. There is a global climate change and a reduction in precipitation, dry years have become more frequent, the conditions of water availability of pastures have deteriorated, overgrazing is taking place, there are no material incentives for the population to restore and protect pastures. These and a number of other reasons led to the degradation of soils and vegetation of pastures, a decrease in the yield of natural forage grasses, a decrease in the feed capacity of pastures, and a decrease in the productivity of grazed livestock.

These pastures are suitable for use throughout almost the whole year, are characterized by a variety of foot forage, its relatively high nutritional value and provide the cheapest feed [1]. Land degradation and desertification are becoming one of the main environmental problems threatening natural ecosystems and socio-economic development of the Republic of Uzbekistan.

Prolonged overgrazing has led to a decrease in pasture productivity, degradation of vegetation and soil cover, violation of the hydrological regime and desertification. Unsystematic, unregulated grazing, excessive concentration of livestock per unit area and inefficient extensive methods of keeping livestock are the main causes of degradation of pastures in the region. Currently, special attention is being paid to the problems of restoring natural phytocenoses of the arid zone and preserving biodiversity, while the issues of restoring degraded lands, due to their ecological orientation, are becoming particularly relevant. An increase in the number of sheep and an increase in the productivity of sheep almost completely depend on the state of pasture grass and the nutritional value of forage vegetation. In this regard, the development of a solution to the problem of livestock development and biodiversity conservation is one of the main tasks.

MATERIAL AND METHODS OF RESEARCH

Field research with the description of test areas by the traditional method, full-scale interpretation of satellite images. Identification of pasture types and determination of the yield of fodder mass on the test areas by seasons. Assessment of the degree of degradation of the vegetation cover of pastures. [1,2]

Description of the research methodology. The assessment of the pasture condition was carried out in areas typical of the composition of vegetation cover and relief characteristic of foothill pastures. Descriptions of vegetation cover were carried out on the selected pasture areas: cutting plants, the parameters of the projective cover and the number of dominant plant species were

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determined. In order to increase the productivity of degraded lands, the practices of sustainable land management were applied, in the direction of reproduction of pasture productivity by artificial seeding on degraded areas.

RESULTS AND DISCUSSION

The monitoring of pastures in Dehkanabad district in 2019-2021 revealed that the productivity of pastures is low and averages about 0,5- 4,5 kg/ha over the years. Dehkanabad State Forestry is located at an altitude of 800-2900 meters above sea level, there are 9 types of pastures and 14 pasture differences. Total area: 105,857.94 ha, pasture 14035.14 ha, other lands 4662.8 ha.



Figure 1. Juniper trees with wormwood and ephemeral plants



Figure 2. Natural pastures of Dehkanabad forestry

The productivity of pastures is 0.05-0.2, in good climatic years up to 0.45 t/ha. In the vegetation cover there are such valuable forage species as *Poa bulbosa*, *Bromus tectorum* in places there are *Carex pachystylis*, *Agropyrum orientale*. Pastures are narrow-zone forage lands used in the spring and summer period. From coarse-stemmed forage plants on pastures there are such species as - *Alhagi pseudalhagi*, *Cousinia resinosa*, *Capparis spinosa*, *Ferula tadshikorum*. However, their number in the herbage is rare, and the value of their forage increases in the summer season of the year.

Landscapes are erosive-tectonic surfaces composed of carbonate limestones and dolomites by subordinate interlayer's of sandstones, conglomerates, clays, shale's on brown soils.

1. Variously dissected slopes of medium steepness with combinations of grass-wheatgrass and wormwood-ephemeral-wheatgrass steppes with tipchak-almond or wormwood-almond woodlands on rocky areas and shrubs along riverbeds.

2. Hilly medium-jointed plateaus with numerous rocky outcrops, with a combination of series of typical steppes with low-grass, mixed-grass meadows and typical petrophytic communities on gravelly open slopes. The type of pasture is mixed grass and wheatgrass among juniper. The pasture difference is wormwood-wheatgrass-juniper [2]. The average yield of this type of pasture over the years in spring is 0.48 t/ha, feed units 260 kg per 1 ha, contains 25 kg/ha of protein. The seasonality of use is summer [2]. In the spring of 2021, the average yield was about 0,23 t/ha.

Table 1. Dynamics of changes in the projective coverage and yield of the Dehkanabad forestry in 2019-2021

No	Plant height, cm	projective coating, %	Yield, t/ha	Sheep capacity, head/ha, for 6 months
2019 years				
1	30	60	0,36	0,80
2	31	57	0,41	0,91
3	35	55	0,39	0,86
Average	32,0	57,3	0,39	0,86
2020 years				
1	41	65	0,51	1,13
2	42	60	0,46	1,02
3	45	65	0,48	1,07
Average	42,7	63,3	0,48	1,07
2021 years				
1	33	60	0,21	0,47
2	35	60	0,22	0,49
3	30	55	0,25	0,56
Average	32,7	58,3	0,23	0,50

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According to Table 1, the percentage of projective coating on various plots and types of pastures ranges from 55 to 60%, on average 58, 3%. The yield of pastures in the conditions of 2021 is significantly lower than in 2020 and varies from 0, 21 to 0, 25 t/ha. The sheep capacity based on grazing for 6 months, on average, is 0, 5 heads per 1 hectare of pasture territory. On good plots, you can keep up to 0,56 heads per 1 ha, these pastures are seasonal and intensively used by the local population for grazing animals, they are recommended for use in the summer and autumn periods of the year and for mowing sagebrush arrays for harvesting for the winter.

Table 2. Yield of pastures of Dehkanabad forestry by seasons, t/ha

Years	spring	summer	autumn	Seed yield, t/ha
2019	0,37	0,40	0,23	0,013
2020	0,41	0,48	0,41	0,017
2021	0,17	0,08	0,03	0,010
On average for 3 years	0,31	0,31	0,22	0,013

According to Table 2, the yield of pastures by season in the summer is slightly higher in the conditions of 2020, 0,48 t/ha, in the conditions of 2021 is slightly lower than in 2020 and averaged 0,17 t/ha in the spring, and 0,08 t/ha in the summer period. By the autumn season, from 0, 03 t/ha of fodder mass remains on pastures. Seed productivity also varies by year, the highest seed productivity was recorded in 2020 at 0,017 t/ha, the lowest in 2021 at 0, 01 t/ha. On average, over two years, the seed productivity was 0,014 t/ha.

Most forest pastures consist of three tiers - a mixture of grasses, semi-shrubs, shrubs and trees. The main threats to forest pastures are irregular and unsystematic grazing of animals, deforestation for fuel, collection of plant and medicinal raw materials, fires, drought, reduction of habitats, reduction of the volume of water sources, as well as the number and reproduction of plant and animal species. Intensive and unsystematic use of mountain pastures leads to degradation and loss of biodiversity.

The increase in the areas of degraded pastures, digression of pastures, deterioration of biotic communities (ecosystems), reduction of soil fertility, erosion and desiccation, aging of forests, reduction of biodiversity, illegal and haphazard cutting of shrubs and trees, haymaking, harvesting of fuel and medicinal herbs have led to the disappearance of many types of forage grasses from the herbage.

In order to avoid a high concentration of livestock on pastures, cattle must be placed on pasture plots in different seasons in accordance with the capacity of pastures. By planning and discussing the annual use of pastures, it is first necessary to identify problems regarding the condition of pastures, availability and appropriate use of limiting factors, as well as conflicts among users, taking into account the interests of the local population in the project areas.

CREATION OF NURSERIES OF PASTURE CROPS ON THE TERRITORY OF DEHKANABAD FORESTRY

Due to excessive load, pasture areas are partially degraded and it is necessary to intensify forage production on the ground. To do this, it is necessary to establish seed production of highly productive forage plants and the creation of multicomponent, highly productive artificial hayfields by sowing such types of forage grasses as *Onobrychis chorossanica*, species of *Astragalus*, *Poa bulbosa*.

To increase the productivity of pastures, the following types of shrubs and semi-shrubs are used: *Kochia prostrata* - a semi-shrub from the family of *Chenopodiaceae*, height 60-90 cm and above. Develops a deep penetrating (up to 5-6 m) root system of a universal type. Productive longevity of 15-20 years. The maximum yield of fodder mass and seeds is noted for 3-4 years of life of 1,2-1,4 t/ ha. 100 kg of absolutely dry feed contains 83,5 -45,9 feed units [3].

Ceratoides ewersmanniana is an ecologically plastic species. They are well eaten by animals, especially sheep and goats. 100 kg of feed contains 41-43 feed units. The growing season is 230-240 days. The yield of dry fodder mass is 1,12- 1,25 t/ha, the seed yield is 0,12-0,17 t/ha. Productive longevity is 17-23 years [3].

On degraded foothill pasture areas within the framework of the UNDP-GEF Project "Sustainable use of natural resources and forestry in key mountain regions important for globally significant biodiversity" In the Dehkanabad forestry, seeds of fodder plants were sown at the seed nursery on an area of 2 hectares. Complete agrotechnical measures were carried out (plowing, harrowing), after sowing, seed sealing was carried out by harrowing. Perennial pasture plants play a crucial role for a stable feed harvest. Within the framework of the project, a nursery of primary seed production of long-term drought-resistant forage crops has been created to increase the productivity of forest pastures and increase biodiversity and use in the system of rotational grazing.

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Some species can be mowed 2 times during the year, in spring and autumn (*Kochia prostrata*) getting easily eaten feed on regrowth after mowing, the mowing can be driven with a conventional mower, or an aggregate. It is possible to graze sheep under a certain load in the spring and get easy-to-eat feed on regrowth after mowing by autumn, i.e. use the pasture twice. With a yield of 1,22 t/ha from 1 ha for the second 2020 year of vegetation, additional guaranteed feed stocks can be obtained from 2 hectares without purchasing on the market. The creation of plots of drought-resistant perennial fodder crops, using resource-saving technology, will allow obtaining about 200-240 kg of seeds for the 3rd year of vegetation from 2 hectares.

The seeds of these plants will be used to restore degraded areas of pastures, and the plants are good fodder in the summer and autumn periods of the year and good hayfields to create a guaranteed supply of feed. Additionally, 3,0-3,2 tons of dry weight can be obtained from a plot of 2 hectares, which will allow you to have a stable feed base throughout the year. In the future, the site can be used in a rotational grazing system as year-round pastures or haymaking. Herbs are grazing in spring and in the first half of summer, *Kochia prostrata* and *Ceratoides ewersmanniana* in summer and autumn.

Plant height of *Kochia prostrata* in the first year of vegetation for 4 months was 25 -150 cm, some individuals grew to 1,5 meters (Figure 6).

Seeds sown in and *Kochia prostrata*, *Ceratoides ewersmanniana* to create a seed plots is aimed at solving the problems of biodiversity conservation in the country, especially in mountain ecosystems



Figure 3. Seed delivery to the field



Figure 4. Seed sealing



Figure 5. Undergrowth *Kochia prostrata*



Figure 6. *Kochia prostrata* plants

There are a lot of small undergrowth of plants of *Kochia prostrata* and *Ceratoides ewersmanniana*, which will grow large in the next year of vegetation (Figure 5).

The density of standing plants thickened in many places of the plot, some plants in the autumn-winter season can be transplanted to other areas in the form of seedlings. In the third year, the fence can be moved to another site, the seeds of the same forage plants can be sown, and the original site can already be used as a primary seed production site and as pastures.

In the seed-growing area, the natural herbage consists of wormwood and ephemeral plants. In the future, the plot can be used as year-round pastures or haymaking. Herbs are cut in spring and in the first half of summer, *Kochia prostrata* and *Ceratoides ewersmanniana* in summer and autumn, and wormwood sprouting in the cenosis in autumn and winter.

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CONCLUSIONS

1. Rational use of pastures, conservation of biodiversity, consistent increase in pasture productivity by sowing plants, the introduction of technologies to increase pasture productivity and the introduction of promising varieties of forage plants are the main tasks of phytomelioration.
2. The creation of a site of drought-resistant perennial forage crops, using resource-saving technology, will allow obtaining about 200-240 kg of seeds from 2 hectares in the 3rd year of vegetation and using them in the future to improve degraded pasture areas.
3. Additionally, 3,0-3,2 tons of dry weight can be obtained from a plot of 2 hectares, which will allow you to have a stable feed base throughout the year.

CONFLICTS OF INTEREST

The authors declare no conflicts of interest regarding the publication of this paper.

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