

Monitoring of dynamic state of pasture plant cover in Kashkadarya Basin

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Abstract. This article gives information about the ecological situation in the areas where scientific research has been conducted in recent times. In particular, the state of desertification of the foothill pastures of the Kashkadarya region of Southern Uzbekistan is highlighted. Also, information about the cases of ephemerals and ephemerals not completing the vegetation process as a result of grazing cattle in the pasture, and the representatives of the weeds spread in the pastures were shown. The wide spread of weed seeds, the presence of indicator species in the territories where they appear, and their levels of occurrence are also highlighted in the work. The dependence of germination levels on the pastures of the Kashkadarya basin on climatic factors and the long duration of drought was analyzed. From this point of view, it is very important to determine the rules, norms and standards for the use of pastures, their reproduction and restoration. Restrictions and bans on the use of pastures, arbitrary use of pastures, prevention and eradication of vegetation are relevant today. The main goal is to conduct an inventory of pastures, carry out geobotanical inspection of pastures, monitor pastures, use pastures, and conduct scientific and financial activities for their reproduction.

1 Introduction

Today, the development of legal measures for the protection of pastures is considered as a global problem in the whole world. It is observed that pastures are more common, especially in the southern regions. Including. This is evident in some regions of South Uzbekistan. This, of course, together with low rainfall and prolonged droughts, are among the environmental problems of today. We are studying the scientific research that is being carried out on a global scale these days. So, we should analyze that now only an ecological approach to pastures through the process of phytomelioration is needed. In this regard, it is important to plant crops suitable for pastures in all four seasons. In the Chirakchi, Qamashi, Guzor, Dehkhana districts of the Kashkadarya Basin, a decrease in precipitation was observed during 2022-2023. This caused the short-term disappearance of ephemerals and

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ephemeroids. We are conducting scientific work on the basis of GIS technologies to update the content of the pasture map of the Kashkadarya basin.

In addition, R. Evit and J. Bartholome studied the issues of preserving the historically formed nature in the development of the livestock network, improving the condition of grasslands [1].

Haddad M., Strohmeier S., Rahbeh M., Nouwakpo S., Al-Hamdan O., and M. Weltz study the stages of sustainable land use and degradation [2]. McGwire K., Weltz M., Snyder K., Huntington J., Morton Ch., and McEvoy D. evaluate early spring cover crop use conditions in Nevada [3]. A. Saparov reveals a sustainable strategy for the use of sustainable soil and plant resources in the Republic of Kazakhstan [4; Pp. 611-619.]. Robinson S., Kerven C., Behnke R., Milner-Gulland E.J., and K. Kushenov analyze the characteristics of socio-economic and biophysical changes in animal husbandry [5]. Alimaev I.I., R.H. Behnke justify the stages of mobility and efficient use of land in Kazakhstan [6]. Xia Wan and Libing Zhang analyzed and recommended an urgent increase in investment in scientific discovery of plant species, while they still survive [7].

Rational use of pastures, including the regulation of the rights and knowing the plant vegetation of pasture users, self-government bodies of citizens, non-governmental non-profit organizations and citizens' participation in ensuring the use and protection of pastures - is an important aspect of pasture conservation. Also, activities such as the procedure for rational use of pastures in studied area, ensuring the plant protection, reproduction and restoration of plants, carrying out local control in the area, and creating optimal mechanisms for measures aimed at maintaining the productivity of pastures, we think these measures will give effective results.

2 Materials and Methods

The material for the study area is pasture plants. Therefore, in determining the floristic composition of the area, we use "Flora of Uzbekistan" (1951-1962) and "Identifier of plants of Central Asia" (1969-1993) identifiers were used. Phytomass structure, species composition, and yield indicators in open fields was determined according to the method of A.P. Shennikov (1964). Also, the state of pasture digression was analyzed according to the method of O. Chogni (1977) and we made a table according to 4 stages of pasture digression: *Weak digression*, *Moderate digression*, *Strong digression* and *Very strong digression*. Pasture factor digression is a variant of allogenic successions towards the decrease of species diversity, which results in simplifying of a plant community structure with selection of plant species, which are more resistant to the pasture factor impacts both of species and of communities in a whole by morphological and ecotypological characteristics [11].

3 Results and Discussion

It is desirable to determine the pasture areas in crisis, restore them, and organize the planting of nutritious crops to increase their productivity, taking into account the soil and climate conditions. Through this, we will have new opportunities to increase the stock of food products, to supply meat and dairy products to the population, and to export them. In this regard, it is necessary to implement foreign experiences and innovative developments aimed at protecting pastures and increasing their productivity without delay. It is also important to protect endemic species found in pastures and not to ignore species included in the "Red Book".

The impact of the human factor on pastures is particularly pronounced in densely populated areas, in areas under the influence of urbanization. As a result of human discovery of protected lands, development of new lands, ecological changes in the kinds and varieties of agriculture, 6-10% of pastures per unit area per year can be degraded [8,9,10,11], so, it may be belonging to soil-climate properties of pasture ecosystems.

Ecological changes in the associations of ephemerals and ephemeroids, especially in the hilly zone, indicate an unfavorable situation in recent times. However, there is a large spread of seeds of wild plants in the hilly region. That is, the weeds found in the hill region include the following species: *Convolvulus arvensis*, *Dodartia orientalis*, *Acroptilon repens*, *Verbascum songoricum*, *Cichorium intybus*, *Artemisia scoparia*, *Turgenia latifolia*, *Vexibia pachycarpa*, *Rlantago lanceolata*, *Lactuca scariola*, *Alhagi pseudalhagi*, *A. sporsifolia*, *Carthamnus oxyacanthus*.

The reason for the expansion of the field of cultivation in the Adir zone is the high percentage of weeds. *Acroptilon repens*, *Poa bulbosae*, *Aegilops cylindrica* are widely spread on the roadsides, around farms, around villages, it was analyzed and compared that the senile period prevails in the representatives of some species, and it shows that the spatial distribution of plant populations is sparse as a result of regressive conditions. As a result of the researches and studies, the area of the species that includes the senile period was shown on the map. Such plant communities are explained on the map with conventional signs at the scale of the transformation areas in the form of associations.

In order to prevent and reduce the breeding process, it is necessary not to increase the quantity of livestock and to alternate use of pasture land. According to experts, 1 livestock should be grazed on 4 ha during the year, but currently 4 livestock are grazed on 1 ha.

The structure (relief) of the land surface in the mountain is complex, and many factors affect to the distribution of shrub and trees. Above sea level, mountain slopes, geology, erosion rate, mechanical composition of the soil, humidity and temperature indicators form communities of different densities under the influence of the external environment. Therefore, in the studied area, trees and shrubs are more common as a unit, a complex. *Berberis oblongo*, *Crataegus pontica*, *Acer pubescens*, *Amygdalus bucharica*, *A.spinosissima*, *C.turkestanica*, *Ephedra equisetina*, *Cerasus erythrocarpa* *ea E.intermedia* and are widespread in mountain ranges.

At a time when climate change is causing inconvenience, excessive unplanned livestock grazing is leading to pasture digression. We divide the pasture digression scale into the following steps:

- 1-2. Livestock grazing is very weak (meadow, large and broad-leaved grass grows).
- 3-4. The grazing effect is weak.
5. Grazing effect is moderate (semi-pasture stage, pasture weeds appear and begin to grow, spikes).
- 6-7. Strong influence of grazing (pasture stage, low pasture conifers dominate, lower, ground cover leguminous plants are present, perennial weeds are abundant).
8. Premature emergence (large spiky plants are greatly reduced, perennial weeds have increased and crowded out pasture spiky plants, grasses have decreased, replaced by alien annuals).
9. Appeared (grasses are strongly reduced and other annuals grow).
10. Fully exposed (soil surface is exposed, single plants grow).

On the basis of the above ecological scale, a classification of geobotanical description of degradation was developed. According to it, the following gradations were adopted for the density of plants: plants are common (>8 %) – c, abundant (2.5-8.0 %) – a, normal (0.3-2.5 %) – n, few (0.1-0.2 %) - f, some (frequently) (<0.1 %) - s. As a result of scientific research, we have studied the development levels of pastures in the foothills of Chirakchi and Dehqonabad districts of the Kashkadarya basin by the method of O.Chogni (1977).

Average natural vegetation cover in spring is 50-60%, and in summer it is 30-33% or less, depending on the degree of degradation. It should be mentioned that the number and density of *Medicago lupulina*, *Poa pratensis*, *Capsella bursa pastoris*, *Polygonum aviculare*, *Bromus tectorum*, *Equisetum arvense*, which means gross and abundant digression, are increasing in the pastures in areas where irrigation agriculture is developed (Table 1, Figure 1).

Table 1. Pasture digression. Note: as a result of unplanned grazing of livestock, changes in vegetation, i.e. pasture digression, are observed in the foothill pastures of the Kashkadarya basin.

Indicator species	Pasture Digression Scale				
	common (more than 8%)	abundant (2.5-8 %)	normal (0.3-2.5%)	few (0.1-0.2 %)	some (rarely)
	<i>c</i>	<i>a</i>	<i>n</i>	<i>f</i>	<i>s</i>
<i>Capsella bursa pastoris</i>	8	7-8	6-9	5-9	3-9
<i>Bromus tectorum</i>				6-7	5-7
<i>Chenopodium album</i>			7	7-8	7-8
<i>Cichorium inthibus</i>			6-7	3-7	2-8
<i>Convolvulus arvensis</i>			1-6	1-6	1-8
<i>Equisetum arvense</i>		2-3	2-4	1-4	1-5
<i>Hypericum perforatum</i>					1-3
<i>Medicago lupulina</i>	9	4-9	2-9		
<i>Plantago lanceolata</i>			3		
<i>Poa pratensis</i>	6-7	3-7	1-7	1-8	
<i>Polygonum amphibium</i>			1-4	1-4	1-5
<i>Polygonum aviculare</i>	7-8	7-8	7-9	5-9	
<i>Prunella vulgaris</i>		3-5	2-6	1-8	1-9
<i>Taraxacum officinale</i>		5	4-8	2-8	1-8
<i>Trifolium pratense</i>		2-5	1-7		
<i>Trifolium repens</i>		6-7	5-8	1-8	



Fig. 1. Areas of dry farming between the Fir-tree territory, 2100 m (a); a flood in the right tributary of the Kyzilsoy river caused by the cutting of spruce trees by the population (2011) (Qamashi district, Kyzilsoy village, coordinates 38.8423 N, 68.2728 E).

After the above discussion, we can make the following conclusions:

- In order to effectively restore pastures, it is necessary to introduce a modern afforestation system, the implementation of this requirement is important in preventing the reduction of mountain forests.

- If prevention of uncontrolled expansion of dry land is the main indicator for effective management of pastures, it is necessary to implement this situation by regulating irrigation and dry farming.

- Effective use of pastures. This is regulated by ensuring the seasonal use of these pastures, while in the future it is managed by regulating the livestock feeding system.

- Establishing a pasture management system is required. This is done through indicators such as introduction of a modern afforestation system, livestock grazing in pastures, including the application of the principle of “pasture capacity”, ensuring seasonal use of pastures, establishing a system of rotating pastures, preventing the uncontrolled expansion of drylands, and restoring abandoned agriculture and pastures.

4 Conclusion

The decrease in the area of pasture plants is explained by the following: First, the influence of natural factors, that is, climate changes. This factor is causing a very complicated situation. There are many dry days. This, in turn, has a negative impact on the state of pastures and flora. Secondly, as a result of climate change, soil erosion has increased tremendously. However, as a result of the erosion of the fertile layer of the soil, millions of tons of nutrients are also destroyed. Atmospheric precipitation is low. Because the rain falls slowly and does not soak into the ground for a long time. The winds have also increased. As a result of the wind, not only drought, but also dust, salt is flying from one place to another. There are more than 21 million hectares of pastures in Uzbekistan, which are an

important resource for many industries such as cattle breeding, sericulture, and beekeeping. But the current procedure for their use limits the development of entrepreneurship and production in the pastures. 50.93% of the total area of our republic is pasture and hayfields, as well as from existing plant resources the most, that is, 1700 species as fodder in animal husbandry is used.

So, as a result of practical researches, we have concluded the position of degraded areas of Kashkadarya basin. In conclusion, we should confirm the ecological education among the people who live near the mountains and foothills; to protect of medicinal and endemic plant communities is essential, in addition, it is important to preserve medicinal plants such as sedum, cadonopsis, and anzur onion as raw materials for the pharmaceutical industry. Strengthening the legal basis of forest protection in the mountain and sub-mountain pastures of Kashkadarya, development of beneficial socio-economic forestry, expansion of the share of the private sector in forestry are considered indicators that will be given special attention and implemented today, and require the development of a plan of measures in time.

In conclusion, it can be said that the strengthening of the legal framework of forest protection, the development of beneficial socio-economic forestry, and the expansion of the share of the private sector in forestry are currently the indicators to be paid special attention to and implemented. This requires the development of a plan of measures in time.

In addition, the development of ecological optimization measures on indicators such as preventing the reduction of mountain forests, regulating the livestock feeding system, and regulating irrigation and dry farming plays an important role in increasing the efficiency of pasture restoration.

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Authors' contribution

Uktam Khujanazarov prepared the research, Dustmakhmat Bakiyev did the map, Nodira Khonkhodjayeva dealt with the references, Bakhtiyor Nigmatullayev interpreted the study, Makhina Isabekova contributed to the concept.

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