

**A. Omarova, S. Turguldinova**

Kazakh national agrarian university, Almaty, Kazakhstan.

E-mail: [abolatbaevna@mail.ru](mailto:abolatbaevna@mail.ru), [turguldinova@list.ru](mailto:turguldinova@list.ru)

## **ENVIRONMENTAL ASSESSMENT OF PASTURE LAND QUALITY**

**Abstract.** In the Message of the President to the people of the Republic of Kazakhstan N. A. Nazarbayev "the Third modernization of Kazakhstan: global from January 2017, it is said "the agro-industrial complex of Kazakhstan has a promising future", "we will help to be one of the largest producers of agricultural export products" [1]. Kazakhstan ranks sixth in the world in terms of its grass resources. Pasture land is 189.0 million hectares, historically being the driving force in the country's economy, as a source of feed resources for the development of livestock [2]. According to the Agency of the Republic of Kazakhstan, there are 27.1 million hectares of pastures that were shot down in an average and severe degree. In the zonal aspect, the destruction of pasture ecosystems is mostly observed in the flat part, where more than 95% of all downed pastures are located, including the desert and semi – desert zones-16.1 million hectares or 60% of their area.

Downed pastures are the main consequence of changing environmental conditions and irrational human economic activity. It is manifested in the loss of valuable forage plant species from the herbage and their replacement with weeds, non-edible and annual species [3,4].

**Key words:** Pasture, agricultural land.

**Introduction.** In the conditions of vertical zoning of soils, for the first time in Kazakhstan, complex studies were carried out. Research on the causes of pasture degradation and development of techniques for their restoration in a specific project area. The implementation of the results of the dissertation work will create conditions for the restoration of degraded pastures with an increase in the growth and development of vegetation cover by 15-18% and increase of livestock production by rational grazing up to 12%.

The theoretical value of the research. The approach to restoration of degraded pastures (restoration of the original natural herbage) through rational use methods gives a new impetus to the theoretical justification of this process of pasture science.

**Scientific novelty.** This article aims to show the possibility of restoring degraded pastures in the system of their seasonal use (spring-summer-autumn) with the use of intra-seasonal pasture rotations. For the intensive development of animal husbandry and further growth of productivity of farm animals, a sufficient amount of cheap full-fledged feed is necessary. In Kazakhstan, since ancient times, natural forage lands have been the main sources of animal feed production. The current state of the world's pastures is assessed as unsatisfactory. Under the combined impact of negative environmental management factors, fragile and easily damaged pasture ecosystems are being degraded. Severe desertification, vegetation and soil degradation affects 27% of the land in North America, 22% in South America, 18% in Africa and 16% in Australia. It should be noted that insufficient forage is frequently aggravated by the farmers and farms who do not use pastures – allow continuous and irregular grazing animals and thereby contribute to the reduction of vegetation, overgrowing weeds and uneaten plants, and in the future to fail with the emergence of wind erosion. In our Republic, hayfields and pastures occupy 188.

7 million hectares and their share in agricultural land is 7.5 times greater than the area of arable land.

Currently, about 48 million hectares in the Republic are degraded due to haphazard use of pastures and keeping of animals due to restrictions on the borders of the grazed territory. As a result, there is a "failure" of pastures and a sharp decrease in the productivity of grass stands. The main area of degraded land is usually confined to localities, since the bulk of farm animals are privately owned. At the same

time, the concentration of livestock on these lands turns them into barren areas, since they are grazed for decades without any use regime [5]. In the world, 2 billion hectares, or 23% of the land used by humans, are subject to some degree of degradation. The main economic consequences of land degradation are a decrease in crop yields and pasture productivity, a decrease in the number of animals and their productivity, as well as a reduction in the export potential of agriculture [6,7]. Grazing of animals has a great influence on the state of pasture ecosystems. Grazing of agricultural animals, mainly excessive, representing one of the forms of direct withdrawal of plant resources-feed, also leads to a significant restructuring of the species composition of grass stands, most of all in desert and semi-desert zones. The negative impact of grazing can be reduced to three main phenomena: changes in vegetation, its functioning (ecological and physiological processes) and disturbance of environments. Initially, grazing leads to an increase in productivity and intensification of exchange processes in the "soil - plant" system, but overgrazing leads to the suppression of herbage and changes in soil cover. With an increased pasture load that exceeds the established size of removal of plant mass, there is a radical restructuring of the ecology of desert communities, their structure and productivity [8]. Grazing has a very strong effect on the plant body, causing a variety of morphological and physiological changes, disrupts patterns in the onset of phenological phases, as well as in the composition of populations. In addition, frequent alienation causes not only a decrease in pasture productivity, but also a strong reduction in soil moisture and mineral salts in the soil. The capacity of underground organs is an indicator of the vital state of plants, as well as their features in the accumulation of carbohydrate reserves [9]. Livestock grazing affects the return of organic matter to the soil in the direction of a negative balance, in addition, there is the use of certain quality plants (remain uneaten coarse-stemmed and poisonous plants) and trampling of plants by the hooves of animals, when grazing by cattle to various degrees, the soil is compacted. This all leads to changes in the composition of plants and, during grazing, to soil erosion [10]. The main reason for the desertification of large areas of pastures in the steppes is the haphazard use of them, as a result of which the vegetation cover gradually becomes sparse, there are deepening and small spots on the soil surface. The soil surface is often knocked out by livestock, which leads to the loss of the fertile soil layer, its erosion with the appearance of a large number of cracks. Pastures are subject to desertification as a result of grazing by livestock, further aggravated by drought and wind erosion. Pasture degradation is expressed in the reduction or disappearance of vegetation, especially livestock feed. Overgrazing by livestock can lead to desertification of land around wells or springs within a radius of 1 to 1.5 km [11]. In semi-desert and desert zones of Kazakhstan, natural pastures and hayfields are characterized by low productivity, uneven yield of feed mass by season. As a result, the balance of natural feed resources is extremely unfavorable, especially the disproportion between summer and winter is great. This leads to the fact that the huge reserves of spring and summer feed are not fully used by the livestock industry, while the most difficult and responsible period in animal husbandry - winter – is the least provided with feed [12]. It should be noted, as A. Voisin emphasizes [13], that animals do not eat grass like other mown food, but collect it. They choose the more delicious part of the herbage and bite it at different heights, depending on the height and density of the grass, the species composition of the herbage and the phase of development of its constituent species. M. A. Shmykov [14] writes that when free grazing cattle roam the entire territory of pastures, looking for tender, delicious plants and trampling all other vegetation. At the same time, well-eaten grasses do not have time to grow enough, as they are again bitten by cattle, unused plants interfere with the normal growth of Otava, and the most valuable plant species, due to continuous biting and trampling by cattle, fall out of the herbage. Less valuable and completely uneatable in-seminating the area of pastures, turn them into little or completely unproductive land. When grazing, the cattle not only eat the grass, but also trample it down. Trampling is considered an important factor in the formation of grasslands of pasture type. At the same time, its influence is evaluated in different ways, on the one hand, trampling has a positive effect on the formation of herbage, since coarse-stemmed grasses and weeds disappear, pasture – tolerant plants begin to prevail-meadow bluegrass, creeping clover, meadow fescue, and meadow Timothy. Due to grazing, the soil is enriched with various microorganisms, since animals leave behind a lot of excrement, which activates the vital activity of their microflora and strengthens the biological processes in the soil. On the other hand, trampling has a negative effect on the pasture, as the aeration and water regime of the soil deteriorates, the growth of grass roots, especially legumes, slows down, and the number of earthworms decreases. Excessive grazing of livestock leads to the disappearance

of valuable plant species from the herbage, including legumes, the appearance of low-value cereals and various grasses, which reduces the yield and longevity of the pasture [15]. The productivity and longevity of pasture grass depends on the way the pasture is used. In Kazakhstan, haphazard and erratic grazing has led to the loss of valuable grass vegetation and reduced yields. As a result, there were strongly dislodged pastures overgrown with poorly eaten harmful and poisonous grasses. On broken pastures, under the influence of intensive grazing, pasture degression occurs along the way of reducing the total number of species and deterioration of the quality of pasture feed.

To stop the progressive decline in the yield of natural pastures and continue to maintain them at a good level, it is necessary to implement a number of measures for care and proper use:

- a) improve the herbage by grazing;
- b) temporarily withdraw or give rest to restore the herbage;
- C) establish a strict order of grazing of farm animals by year and season;
- d) strictly control the load of livestock;
- d) to carry out agro-technical measures to care for the grass.

All these measures for pasture care and use are combined into a system of pasture turnover. Therefore, the basic condition of the rational use of pastures is the use of pastebot providing for adjustable grazing system paddocks, compliance with the established routine of pasturage and technology grazing of herbage, alternating years in each paddock beginning and ending dates of grazing, and if necessary, periodic shifts in the paddocks grazing on the hay [16].

Zh. a. Zhambakin [17] writes that the main task of the technology of using grazing lands in the system of pasture rotations and paddocks is:

- restore the indigenous or somewhat different (production) agrocenosis on the pasture, which will be most profitable from an economic point of view in specific environmental conditions;
- to keep this most productive agrocenosis as long as possible in the conditions of grazing of farm animals;

This system in the language of practitioners has acquired the name "large-scale use of pastures". The technology of a large-car system of arid pasture exploitation consists of the following elements: the choice of a place for organizing fenced pastures with a scheme of pasture rotations; zootechnical and veterinary requirements for pasture rotations; the number and size of pens; the organization of the territory and technique of pasture use; water supply; organization of labor for livestock breeders. The main cheap way to maintain high productivity and improve the conditions for keeping livestock in the summer is to introduce a rational system of pasture use-the basis of which is based on paddock grazing. The use of pastures 24 should be carried out according to a specific plan. For each herd of cattle, a herd of horses, a flock of sheep, it is necessary to have a specific area of pasture that guarantees the need for green feed during the pasture period. The area of the plot depends on the total demand for green (pasture) feed, taking into account the livestock, the yield of the plot and the dynamics of its distribution during the season [18]. One of the ways of rational use of meadow grass is its pasture use and corral grazing of animals. To ensure maximum productivity of grasslands, they must be created on fairly fertile, well-drained land, while performing a full range of techniques for rational use and care of them. As you know, pastures must meet the following requirements:

- a) produce high yields of cheap pasture feed, which corresponds to intensive land use;
- b) ensure a uniform supply of green mass throughout the pasture season in order to fully meet the daily need of livestock for green feed;
- C) pasture grass must contain in a certain ratio and quantity all the necessary ingredients of the diet for animals, i.e. it must be highly nutritious;
- d) exclude the possibility of infectious infection of animals and promote their health [19-20].

Grassland plants are long preserved in the pasture in comparison with plants of the upper leafage due to the fact that after bleaching, they quickly recover spare plastic substances. In turn, grass-roots cereals, legumes, and various grasses give way to plants with basal leaves, with leaves pressed to the ground, and plants with creeping shoots, since these plants have leaves that are less accessible to animals for grazing. The main pasture territory of Kazakhstan is arid regions with arid climate conditions. The main factor determining the state of these lands is the grazing of farm animals. The concentration of livestock around localities causes degradation of soil and vegetation cover. The specificity of this phenomenon is a

reduction in the photosynthetic activity of plant associations, a decrease in the productivity and quality of phytomass, and the loss of landscape-stabilizing function of vegetation. The consequences of desertification are expressed in a decrease in the forage capacity of pastures, feed nutrition, contamination with poisonous and non-edible species, loss of diversity of species and indigenous types of pastures, the emergence of territories unsuitable for grazing, the growth of pockets of soil deflation. In these conditions, a new strategy for the use of pasture resources of the Republic is needed, which should radically change the increasingly entrenched trend of environmentally abnormal land use. In addition, the development of grazing pastures is a set of measures related to the definition and selection of the required area, securing it for commodity producers with subsequent geobotanical survey, guaranteed water supply, determining the feed capacity and grazing livestock, creating infrastructure for housing and work of livestock breeders. This work is devoted to the solution of this issue, the rational use of natural pasture.

**А. Омарова, С. Тургульдинова**

Қазақ ұлттық аграрлық университеті, Алматы, Қазақстан

### **ЖАЙЫЛЫМДЫҚ ЖЕРЛЕРДІҢ САПАСЫН ЭКОЛОГИЯЛЫҚ БАҒАЛАУ**

**Аннотация.** Қазақстанның негізгі жайылымдық аумағы – климаттық жағдай бойынша құрғақ аридті аймақтар. Осы алқаптардың жай-күйін анықтайтын басты фактор – ауыл шаруашылығындағы жануарларды жаю. Елдімекендер айналасындағы малдың шоғырлануы топырақ және өсімдік жамылғысын тоздырады. Бұл құбылыстың ерекшелігі – өсімдік қауымдастықтарының фитосинтетикалық белсенділігінің қысқаруы, фитомассаның өнімділігі мен сапасының төмендеуі, өсімдіктердің ландшафты-тұрақтандырушы қызметінің жоғалуы. Шөлейттенудің салдары жайылымдардың азықтық сыйымдылығының төмендеуі, азықтың қоректенуі, улы және жеуге болмайтын түрлерімен ластануы, жайылымдардың түрлері мен байырғы типтерінің түрлі шығыны, жаюға жарамсыз аумақтардың пайда болуынан және топырақтың дефляция ошақтарының көбейгендігінен көрінеді. Бұл жағдайда республиканың жайылымдық ресурстарын пайдаланудың жаңа стратегиясы қажет, ол экологиялық нормаланбаған жер пайдаланудың неғұрлым тамыр жаю үрдісін түбегейлі өзгертуі тиіс. Бұдан басқа, шалғайдағы жайылымдарды игеру – талап етілетін алқаптарды анықтау мен іріктеу, оны тауар өндірушілерге бекітіп, кейіннен геоботаникалық зерттеу, кепілдендірілген сумен жабдықтау, мал азығын және жайылатын мал басын анықтау, тұрғын үй мен малшылардың жұмысы үшін инфрақұрылым құруға байланысты іс-шаралар кешені. Зерттеу жұмысы осы мәселені шешуге, табиғи жайылымдарды ұтымды пайдалануға арналған. Мақалада нақты шаруашылықта дәстүрлі жүйесіз пайдаланумен салыстырғанда жайылым айналымы жүйесінде маусымдық жайылымдарды пайдаланудың артықшылығы көрсетілген. Жалпы алғанда, бұл жерлерден бас тартуы жануарлардың шектеулі алаңда шоғырлануына, маусымдық және пайдаланылатын алқаптардың бұзылуына, жайылымдық жүктемені, жерді пайдалану мерзімін сақтамауына байланысты.

Көптеген аудандар мен облыстарда бұл мәселе өзекті саналады, өйткені мал басының (жайылымда жайылып жүрген жануарлар) 1 га пайдаланылатын мал азығының көлемі жайылымдардың жалпы мал азық базасынан едәуір асып түседі. Осы себепті жануарларды суланған жайылымдарға тиеу жылдамдығы артады. Мұндай сәйкессіздік кейбір жағдайда жайылымдық егіншілікті экологиялық және экономикалық реттеудегі қиындықтарға алып келді. Бұдан басқа, қазіргі уақытта жайылымдық жерлердің тозуының негізгі себебі қоғамның барынша табыс алуға ұмтылуы болып саналады, бұл табиғат әлеуетінен асатын табиғи ресурстарды өндірудің ақталмаған жоғары көлеміне әкеледі. Республикадағы жайылымдардың қазіргі жай-күйі, бір жағынан, жайылымдық мал азығының өнімділігі мен сапасының үдемелі нашарлауы, ал екінші жағынан суланған жайылымды, әсіресе, балық қақ және ауылдық алқаптарды жүктемені және қарапайым жайылым айналымын сақтамай өте қарқынды пайдалануы негізінде сипатталады, бұл бірте-бірте экологиялық балансты бұзды, мал азығы қорларының азаюына, сонымен қатар жердің тозуына, жел эрозиясының пайда болуына және арамшөптің және жеуге болмайтын өсімдіктердің көбеюіне әкеп соқтырды.

Жұмыстың өзектілігі белгілі бір аймақтағы алыс жайылымдарды пайдалану арқылы жайылым ресурстарын пайдаланудың ғылыми негізделген тәсілдерін қолдану негізінде шешімдерге бағытталғандығына байланысты. Осыған байланысты мал шаруашылығын жүргізудің жаңа нысанын әзірлеу, яғни малды шалғайдағы учаскелерге ауыстыру және тозған жайылымды азайту мақсатында жыл мезгілдері бойынша осы учаскелерді пайдалану аграрлық зерттеулердің перспективті бағыты болып саналады және республиканың мал шаруашылығы саласының сұранысын көрсетеді.

**Түйін сөздер:** жайылымдар, ауыл шаруашылығы алқаптары.

**А. Омарова, С. Тургульдинова**

Казахский национальный аграрный университет, Алматы, Казахстан

### **ЭКОЛОГИЧЕСКАЯ ОЦЕНКА КАЧЕСТВА ПАСТБИЩНЫХ УГОДИЙ**

**Аннотация.** Основная пастбищная территория Казахстана – засушливые по климатическим условиям аридные регионы. Главный фактор, определяющий состояние этих угодий – выпас сельскохозяйственных животных. Концентрация скота вокруг населенных пунктов вызывает деградацию почвенного и растительного покрова. Специфика этого явления – сокращение фитосинтетической активности растительных ассоциаций, снижение продуктивности и качества фитомассы, потеря ландшафтно-стабилизирующей функции растительности.

Последствия опустынивания выражаются в снижении кормоемкости пастбищ, питательности корма, засорении ядовитыми и непоедаемыми видами, потерями разнообразия видов и коренных типов пастбищ, возникновении территорий, непригодных для выпаса, разрастание очагов дефляции почв.

В этих условиях нужна новая стратегия использования пастбищных ресурсов республики, которая коренным образом должна изменить все более укореняющуюся тенденцию экологически ненормированного землепользования. Кроме того, освоение отгонных пастбищ – это комплекс мероприятий, связанный с определением и отбором требуемой площади, закреплением ее за товаропроизводителями с последующим геоботаническим обследованием, гарантированным водоснабжением, определением кормоемкости и выпасаемого поголовья, созданием инфраструктуры для жилья и работы животноводов. Решению именно этого вопроса, рациональному использованию естественных пастбищ посвящена данная работа.

В представленной работе показано преимущество использования сезонных пастбищ в системе пастбищеоборота по сравнению с традиционным бессистемным использованием в конкретном хозяйстве. В целом отказ этих земель произошел из-за большей концентрации животных на ограниченной площади, нарушения принципа сезонности и используемых площадей, несоблюдения пастбищной нагрузки, сроков землепользования. Во многих районах и областях этот вопрос особенно актуален, поскольку прирост поголовья скота (животных, пасущихся на пастбищах) на 1 га используемой кормовой площади значительно превышает валовую кормовую базу пастбищ. По этой причине увеличивается скорость погрузки животных на обводненные пастбища. Такая диспропорция привела в некоторых случаях к трудностям в экологическом и экономическом регулировании пастбищного земледелия. Кроме того, в настоящее время основной причиной деградации пастбищных угодий является стремление общества к получению максимально возможного дохода, что приводит к неоправданно высоким объемам добычи природных ресурсов, превышающим потенциал самой природы. Современное состояние пастбищ в республике характеризуется, с одной стороны, прогрессирующим ухудшением продуктивности и качества пастбищных кормов, а с другой – чрезмерно интенсивным использованием обводненных пастбищ, особенно приколхозных и приаульных массивов, без соблюдения нагрузки и элементарного пастбищного оборота, что постепенно нарушало экологический баланс, приводило не только к снижению кормовых запасов, но и к деградации земель, появлению ветровой эрозии и зарастанию сорняками и несъедобной растительностью.

Актуальность данной работы заключается в том, что она направлена на решения посредством использования научно-обоснованных подходов по эксплуатации пастбищных ресурсов с применением отгонно-пастбищного использования на конкретной территории. В связи с этим разработана новая форма ведения животноводства, то есть перевод скота на отгонные участки и использование этих участков по сезонам года с умеренным стравливанием с целью снижения деградации пастбищ является перспективным направлением аграрных исследований и отражает запросы животноводческой отрасли республики.

**Ключевые слова:** пастбища, сельскохозяйственные угодья.

#### **Information about authors:**

Omarova Aida, dr. PhD, Fields of interest, Cadastre. Kazakh national agrarian University, Almaty, Kazakhstan; abolatbaevna@mail.ru; <https://orcid.org/0000-0002-0590-8953>

Turguldinova Sabira, Fields of interest:., Cadastre. senior lecturer, Kazakh national agrarian university, Almaty, Kazakhstan; [turguldinova@list.ru](mailto:turguldinova@list.ru); <https://orcid.org/0000-0003-3693-8212>

## REFERENCES

- [1] Address of the President of the Republic of Kazakhstan to the people of Kazakhstan. Third modernization of Kazakhstan: global competitiveness // Kazakhstan true. 2017. N 20 (28399). P. 2-3.
- [2] Experts named the causes of pasture degradation in Kazakhstan // <http://meta.kz/novosti/kazakhstan/735200-specialisty-nazvali-prichiny-degradacii-pastbisch-v-kazakhstane.html>.
- [3] Land resources/ national report on the state of the environment environment of the Republic of Kazakhstan // <http://doklad.ecogofond.kz/zemelnye-resursy>
- [4] Land resources / Ministry // <http://mgov.kz/ru/zher-resurstary>
- [5] Meshetich V.N., Ayaganov A.B. Haymaking and pastures-it's time recovery // Agro inform. 2013. N 4. P. 2.
- [6] Rassomakhin I.T., Kucherov V.S., Kozhagaliyeva R.Zh. Ecological direction of assessment of forage lands of the dry-steppe and semi-desert zones of the Urals and the Volga region // Bulletin of agricultural science of Kazakhstan. 2008. N 5. P. 32-35.
- [7] Le Houerou H.H. Ecological management of arid grazing land ecosystem // IUCN. 2005. P. 45-49.
- [8] Shamsutdinov Z.Sh. Ecology of desert communities. M.: Kolos, 1982. P. 124-131.
- [9] Evseev V.I. Pastures of the South-East. Orenburg: Chkalov publishing house, 1980. 262 p.
- [10] Ryspekov T.R. Successional processes of landscape restoration in the Republic of Kazakhstan. Germany: LAP LAMBERT Academic publishing, 2012. 92 p.
- [11] Problems of desertification (collection of materials). UN environment programme. M., 1984. P. 9-27.
- [12] Chervinskiy V.F., Naturalists A.A., Schislenok M.P. Some issues of development of semi-desert and desert pastures of Kazakhstan. Issues of development of pasture lands in semi-desert and desert areas of the USSR. M.: USSR Academy of Sciences, 1957. P. 7-32.
- [13] Voisin A. Pasture productivity. M., 1959. P. 32-57.
- [14] Shmykov M.A. Organization and use of pastures of the South-East. M.: Selkhozgiz, 1952. 339 p.
- [15] Shelyuto V.B., Shelyuto A.A. Pastoral production: a training manual. Minsk: Novoe Znanie; M.: INFRA-M, 2012. P. 97-168.
- [16] Mozhaev N., Serikbaev N. Workshop on fodder production. Astana: Printing house of S. Seifullin Kazgatu, 2007. P. 51-52.
- [17] Zhambakin Zh. A. System of large-scale use of desert pastures. Productivity of arid pastures. Alma-Ata: Kainar, 1983. P. 55-60.
- [18] Resource-saving technologies for improving hayfields and pastures in the Central Chernozem region (manual). M.: FSU RTSSK, 2012. P. 32-33.
- [19] Andreev N.G., Afanasiev R.A., Korotkov B.I., Merzlaya G.E. Irrigated cultural pastures. 2nd ed., additional ed. Acad. VASKHNIL N. G. Andreeva. M.: Kolos, 1972. P. 140-141.
- [20] Andreev A.V. The Combined grassland – a guaranteed source of feed // Combined use of cultural pastures. M., 1985. P. 5-20.
- [21] News of the National Academy of Sciences of the Republic of Kazakhstan. Series of Social and Human Sciences. ISSN 2224-5294. 2019. Vol. 2.