Amelioration of the Greater Caucasus landscape and surrounding areas to the impact of soil-erosion process

Jarullayev Asaf Sharbat, Ibrahimov Tahir Oruc

Baku State University, AZ1148, Baku, Z.Halilov street, 23, Azerbaijan

Abstract*: The major problem of mountainous terrain is a small amount of land suitable for farming operations. Climate change and land depletion also have a negative effect. This article examines the current status of mountainous areas and their change in the context of the Caucasian Mountains. It also provides recommendations for reducing negative factors. Thus, we have used the following sets of methods: general geographic and topographic. We have also carried out field studies.*

Keywords: *erosion, agricultural landscape, hay field , mountain – meadow, cones crumbled*

1. Introduction

The height of the Great Caucasus and the surrounding areas, soil erosion zones spread 100 - 4466 m Substitution of the landscape types, orographic, climate indicators to facilitate the violation of the erosion of the landscape creates an opportunity to observe the dynamic development [1-3]. Typological classification of landscapes and their theoretical basis of [4-7] monographs and other researchers have found their explanation. To continue with the research-to-date geographic information systems, transforming the landscape altitude zones of the problems of erosion, water, wind, and to determine the density of the network of ravines and gorges, opportunities arose.

The cause of the Great Caucasus elevation zone are as follows: heat altitude varies in different areas, each 100 m mountain peak in the temperature falls below 0.5-0.6, the evaporation is reduced, the amount of precipitation increases to a certain height. Other factors are exposed to variability in physical and geographical conditions, eventually being replaced by a new landscape zone or type [8-10]. Geomorphological zones altitude, climate and landscape characteristics differ from each other. Fold-denudational areas such as steep slopes replaced, plateaus and plains and sloping plains surrounded by their blocs tend to switch. According to the law of climatic zones vary depending on the height above sea level and the landscape, the mountains rising from the plain transition temperature [11-13]. Greater Caucasus is very rich and diverse landscape of high mountain meadow steppe vegetation of the land and set up slightly different from wild type. Physiographic map of high, medium, front, low mountains, various promotion and bending zones, crests, knees, sloping plains, valleys is of interest as elements of relief. Along with the proper management of natural conditions, soil erosion is not a major cause of agricultural landscapes' organization, resulting in increased circulation of one million hectares of agricultural land.

Thus, temperature range and vegetation area frequency verify in the Caucasus Mountains. This makes it possible to consider the effect of climate changes under different weather conditions. In this regard, the purpose of this article is to consider the current status of the Caucasian Mountains: plant and soil changes.

2. Method

We have used a set of methods relevant to the research goal: geological and topographic methods, analysis and synthesis.

We have generalized the scientific data provided by domestic and foreign researchers on the research subject.

As an experimental base, we have carried out our field studies in the Shahdag Mountain area.

3. Data, Analysis, and Results

Alpine and subalpine zone of the Greater Caucasus mountain-meadow landscape of 1800-2000 m above sea level in high mountain areas. The lower slopes of the mountain-meadow landscape of the watershed area, especially in the area of improvement was formed surfaces. 35-40 tendency to surface slopes of the mountain-meadow landscapes

exceeding thick soil cover is usually less exposed to an intensive cleansing. Vegetation productivity is low, the development of the root system is weak. Well-developed, especially in the highlands of vegetation in the high mountain meadows, and 80-90% of them are used as summer pasture. High mountain meadows of the river network-intensive pieces, so in some places the river valleys cut relief 800-1200 m depth.

Greater Caucasus high mountain meadow landscape is characterized by cold winters and humid climate, are in the 900-1300 mm rainfall. Snow cover is legally October-March, long-term stays in the northern and western slopes, south, south-eastern slopes are more open and melted ends on hot days. Here primary mountain meadow land, grassy tight, soft, fatty, black soil types spread like a mountain meadow. Based on the high mountain meadows and grassy land development, land cover and erosion washing process, there remains significant. Water and soil is an important regulatory role in the meadows. However, the length and inclination of slopes vary depending on the degree of soil erosion intensity. The development of tourism and summer pastures in the landscape increases the systematic use of the surface currents. The erosion of the legitimacy of the mountain-meadow landscapes and change the structure of the plant formasiyasını, formed by the degradation process, it comes down to summer pastures productivity, as well as decreasing the amount of humus in the soil. Our observations show that the broken layer of turf field intensity up to 2.5 mm per hectare when pouring 58.3 m / ha of land to be washed, however, remains intact layer of grass on the slope of the land during heavy rains washed intensity up to 2.5 mm. Exposed to erosion process productivity pastures 20-25 cents / ha in the case of a grassy area severely washed 2,5-3,0 s / ha was not over.

Landscapes of high mountain meadow vegetation consists mainly sub-alpine and alpine meadows. Sub-alpine meadows, grassy meadows, forest zones and a variety of family consisted of the above-rolled grain, grass height of 40-90 cm, is a review of some of the sunken places and sub-alpine meadows and 1.5 m in one of the characteristics of the variety of species composition of vegetation. Low growing alpine meadows, different - genus of plants. Buttercup high mountain meadows, alfalfa, thyme, mint and others. The basis of the modern vegetation is grass types.

Greater Caucasus highest mountain - great meadow landscape transformation of anthropogenic factors. Operation of summer pastures, grazing is wasted, leisure centers lawn without deterioration of infrastructure, leads to destruction of vegetation, soil nails, strips, flocks of sheep, grass cover seyrəldir opening trails, slopes, resulting in the formation of host rocks turned out to create the conditions for the rocky landscape. Grazing pastures in the area of 1000 m^2, 25 - 29 are on the trail. The river forms of tracks and marks a ravine in the future.

Greater Caucasus mountain and forest landscape of 400-500 m above sea level in the mountainous part of the lower and middle elevations, which begins, the upper border of 1800-2000 m in most cases, it is the absolute height of 2200-2300 m. 12.1% of the total area of forests make up 95% of the forests in the mountains and the soil is of great importance at the water regulator. Forests comprising the bulk of precipitation, washing away the soil remains.

It is known that 85-90% of the forest area absorbing atmospheric deposition, groundwater flow into the low-lying areas and regulates the water regime. Department of fresh water to meet the demands of mountain forests have already been realized. Which provides drinking water to the city of Baku with the settlement of the mountainous regions of groundwater is an example. Large areas of southern slope of the Greater Caucasus mountain forest landasaftı clearly distinguishable from each other by taking half of its kind that creates zones. Alex and cross rivers in the mountainous area of approximately 1500 km^2 Mazim - is the mountain forest landscapes. The upper boundary of forests, as well as to the effects of the lower border of the natural and anthropogenic factors is a very sinuous line.

Many researchers have shown that the global climate change on forests in mountainous areas in recent decades has been moving upwards [14]. Boundary of the forest landscape of the southern slope of the Greater Caucasus, changing species composition slope processes (landslides, avalanches, ufantı cone, etc.) and anthropogenic activity has played a significant role. Passes the southern flanks of the highway and the border of the forest is

much more intensive broken and fell down in the forest. The relative height of 300 m over 70 years in the forests of the broken areas. Wide area stretching to the south of the mountain tributaries does not hold a narrow and deep depressions, landslides, the internal structure of the complicated landscape of the forest ravines, steep and precipitous slopes to the south, the northern slopes of the somewhat subdued. The sliding zone, avalanches, cones crumbled, ravines, occupies an important place in the landscape of fomenting internal differentiation of precipitous slopes. Landslides in the southern slope of the landscape industry in violation of river basins, which seems to play an important role. The total area of 425 km2 of forest landscape landslide reaches daxilıində [7]. Landslides, avalanches, forest landscape fragments and flood events as a rule violates the territorial unity, changing moisture conditions and flow. Several parts of the extended erosion of rivers - intermountain depressions formed tectonic origin. Mountain forests in the mild climate with dry winters - hot. 940 mm of precipitation per year, the land forming the landscape of brown, brown-mountain mountain-forest and forest soils, alluvial-meadow soils in river valleys. Light brown mountain - forest soils in the upper part of the zone, spread out beneath the beech forests.

Type the south slope of the land and half the vertical zone types are interchangeable. The total area of 1024.2 hectares. His 249.4 thousand ha or 23.9% of the mountainous areas of high mountain meadow, mountain-forest-steppe meadow and mountain-meadow soils fall. The country is one of the most important natural and economic importance. Complex terrain conditions, inefficient use of land erosion in the region have created conditions for the development of the loudspeaker.

According to our field surveys and maps of south-eastern slope of the landscape types of pastures for grazing and distribution (% -) Figure 1 below shows the results of :

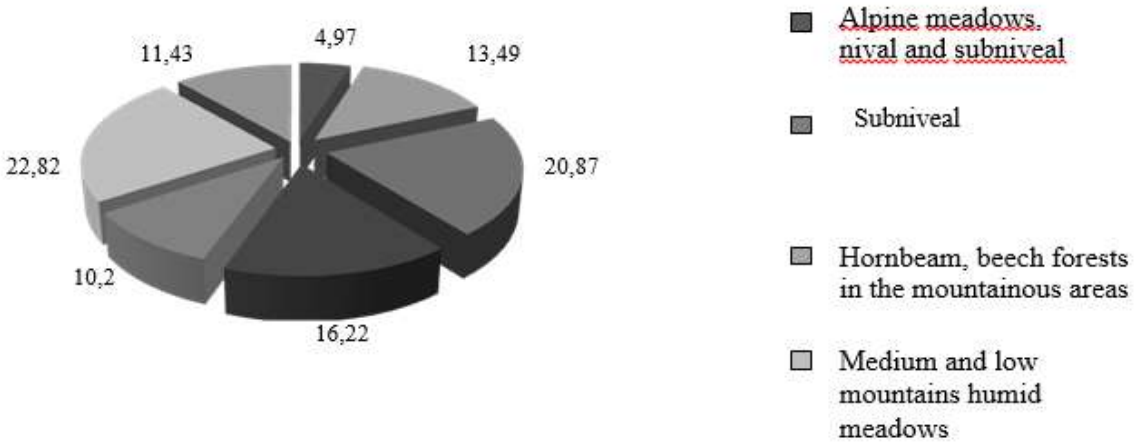

Fig. 1. The results of study

Hectares or 63.16% of the land area to village 95128.85, 34102.99 hectares or 22.64% of the winter pastures, 21385 hectares or 14.20% of the pastures are used under the summers. In general, summer and winter pastures and pastures, or 4.97% to 7484.75 hectares of meadows, alpine and nival and subniveal landscape areas, or 13,49% of the sub-alpine meadows landscape 20313.15 hectares, 31434.15 ortadaglıgın hectares or 20.87% of the landscape hornbeam, beech forests, 24436 hectares or 16.22% of the medium and low mountains humid meadows landscape 15345.2 hectares or 10.2% of the low, middle mountains landscape of dry steppes, or 22.82% of 34370.67 hectares of semi-desert landscape low mountains' plain and mountains, desert 17232.35 hectares or 11.43% of the alluvial plains distributed across the landscape.

4. Discussion

Balakan the north-west, Shaki, Oguz, which includes the administrative regions and the diversity of the landscape are clearly seen. Geomorphological features: high mountains, the average upland, lowland, mountain, valley and Ajinohur Haftaran - Alazan the most part characterized by depression. The absolute height of 100 m from the shore of the lake is Ajinohur [15].

More than 75% of the surface area of high mountain slope erosion potential is dangerous because it is more than 30˚. A very harsh climate, the average annual precipitation is 1200-1400 mm. The climate of mountain meadows somewhat weakens the process of decomposition of plant residues.

High mountain zone of the Greater Caucasus mountain-meadow soils are widespread in 3 types: mountain-meadow, steppe, mountain meadow. Bozqırlasmıs the southern slope of the mountain-brown forest soils developed over the destroyed forests. It is distinguished by a high amount of humus soil, the top layer of 7.2 - 8.3% of the reaches. The complex topography of the region, the slope of the lands for grazing, cultivation, the use of meadows, deforestation has caused an escalation of the erosion process.

Brown mountain-forest soils and middle slopes of the Greater Caucasus mountain slopes of the southern slope significantly lower the total area of land holding is 14% or 146.3 thousand ha. Gray-brown soil zone 200-500 m height spread spread out to dry subtropical valleys and foothills region accounted for 20.7%, or 216.2 thousand hectares covers. The climate is characterized by relatively mild winters and hot summers. Gray-brown limestone soils in areas of high prevalence, conglomerates, tufted breccia, sandy and gently plays the role of source rocks underlying soil erosion products.

Agricultural land areas in the southern slope of the Greater Caucasus turnover was 464.2 thousand hectares, 44.5% of the total area of 282.8 thousand ha or 27.1% of the forest and bushes, whether under national economy occupies an important place.

Negative events in the inefficient use of land erosion, soil salinity, and ultimately contributes to the loss of their fertility. Agricultural landscape 295.4 thousand ha or 28.4% and other fields, severely eroded soils, the quality was very low rates. This area of 282 ha of natural forests and economic zone, 27.1% of the total area is -mi, soil protection, water and environmental regulatory function is of paramount importance. 43.8 thousand hectares of forest in the most Balakan or 42.8% of the area, relatively little Sheki in the region is 42.5 thousand ha or 17%.

The erosion in the dynamic development of the regions mentioned above. Gah district of more than 117.5 thousand ha and 102.6 thousand hectares of land have been eroded in some cities. 130.8 thousand hectares of land in the most severely washed fall to Sheki and Gabala regions. 167.3 thousand hectares of arable land area in the region was six, 16% of the total area. Much of the land is arable area is shaky, 63.2 thousand ha, accounts for at least part of Balakan region is 12.8 thousand hectares.

5. Conclusion

Gully erosion along the southern slope of the Greater Caucasus-line density of the network is also available in the ravine. Gully erosion at the foot of the mountain regions Oguz more prevalent km^2 their density reaches 3-5. According to the development of the natural habitat of the erosion process is almost linear in the region by erosion, wind erosion is less common, however. Natural landscape areas, pastures, more especially in the summer pastures, hayfields, while less exposed to erosion process.

To ensure the protection of land-reclamation complex landscape of the following measures should be taken: to protect the soil from erosion, structural, water, air, environmental regulation regime, has a decisive influence on the fertility of the soil-erosion assess the situation and finally reclamation landscape, landscape-transformation problems, plants degradation (desertification), prevention is of paramount importance.

References

[1]. Forte A.M, et al. Reconciling Invariant Topography with Significant Along-Strike Gradients in Climate and Tectonics in the Greater Caucasus. AGU Fall Meeting Abstracts, 2015.

[2]. Shahgedanova M, Nosenko G, Kutuzov S, Rototaeva O, Khromova T. Deglaciation of the Caucasus Mountains, Russia/Georgia, in the 21st century observed with ASTER satellite imagery and aerial photography. The Cryosphere 2014; 8(6): 2367-2379.

[3]. Forte AM, Kelin X. Whipple, and Eric Cowgill. Drainage network reveals patterns and history of active deformation in the eastern Greater Caucasus. Geosphere 2015; 11(5): 1343-1364.

[4]. Budagov BA. The Azerbaijan SSR – the landscape map. Azerbaijan SSR, Earth Sciences 1970; 6.

[5]. Museyibov MA. The landscape of Azerbaijan, 1981. p.114.

[6]. Nabiyev VN. On the valley landscape types Alazan-Ayrichay. ASU, Aspirants conference materials. Baku, 1964. p.136.

[7]. Prilipko LI. The Plant Cover Azerbaijan. Baku, 1970. p.172.

[8]. Bleyhl B, Sipko T, Trepet S, Bragina E, Leitão PJ, Radeloff VC, Kuemmerle T. Mapping seasonal European bison habitat in the Caucasus Mountains to identify potential reintroduction sites." Biological Conservation 2015; 191: 83-92.

[9]. Candaux Z, Sosson M, Adamia S, Sadradze N, Alania V, Enukidze O, Chabukiani A. Tectonic stages in Southern Greater Caucasus and Adjara Trialeti belt in Georgia: new results on timing and structures of inverted basins. EGU General Assembly Conference Abstracts 2017; 19.

[10]. Magiera A, Feilhauer H, Tephnadze N, Waldhardt R, Otte A. Separating reflectance signatures of shrub species–a case study in the Central Greater Caucasus. Applied Vegetation Science 2016; 19(2): 304-315.

[11]. Tephnadze N, Abdaladze O, Nakhutsrishvili G, Simmering D, Waldhardt R, Otte A. The impacts of management and site conditions on the phytodiversity of the upper montane and subalpine belts in the Central Greater Caucasus. Phytocoenologia 2014; 44(3-4): 255-291.

[12]. Shetekauri S, Shetekauri T, Kvlividze A, Chaligava O, Kalabegishvili T, Kirkesali EI, Chepurchenko OE. Preliminary results of atmospheric deposition of major and trace elements in the greater and lesser Caucasus mountains studied by the moss technique and neutron activation analysis. Annali di Botanica 2015; 5: 89-95.

[13]. Magiera A, Feilhauer H, Otte A, Waldhardt R, Simmering D. Relating canopy reflectance to the vegetation composition of mountainous grasslands in the Greater Caucasus. Agriculture, ecosystems & environment 2013; 177: 101-112.

[14]. Jerullayev ASh. Ecosystem effects of soil-erosion process in Azerbaijan. BSU. Science News. Baku 2000; 3: 57.

[15]. Jarullayev ASh. Regionaldestabilization steppe landscapes of Azerbaijan their reclamation. Academic Journal of West Siberia 2014; 6 (55): 27-30.