
ASPECTS OF EFFICIENT USE OF WATER AND LAND RESOURCES IN AZERBAIJAN

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Abstract

If you're on land, it's up to 5%, water-saving low-intensity irrigation systems. Therefore, the groundwater grows every day. A comparative assessment of water conservation methods was carried out, and the introduction of water-saving irrigation technologies proved to be the least expensive method for obtaining additional water. The results of the study show that up to 96% of the irrigated land is watered with traditional methods of irrigation (furrows and fillings) via surface methods, and the remaining 5% is watered with the use of progressive water-saving low-intensity irrigation systems. Therefore, in fields, the level of groundwater increases every day.

Keywords: irrigation, arable land, groundwater, erosion, salinization, humus, etc.

INTRODUCTION

The total area of the Republic is 8641500 hectares of land, 55% of which, i.e., 4756500 hectares, is suitable for agriculture. Alternatively, 16.6% of the total area or 1,432,600 hectares constitute irrigated land. A total of 1,804,800 hectares of total land balance is arable land suitable for agriculture. Notably, 181600 ha of the total available area of arable land is occupied by secondhand Armenian aggressors. 224,700 hectares of arable land, perennial crops, 11,700 hectares of hayfields, pastures 2,560.0 thousand hectares, 45.7 hectares of fallow areas. In the country of the yards, 258,100 hectares (227,600 hectares of arable land) and 1,038,800 hectares are included in the proportion of forest plantations. [2,6].

In connection with the increase in the population, which now number approximately 10 million people, the land is used outside of agricultural projects and allocated for the construction of individual buildings and structures, severely frowning individual types of soil erosion, and on the other hand, the rise in the groundwater table as a result of the rise in sea level, improperly managing agro ameliorative measures, production areas on individual farms, and applying violations of the rules of ecologically

safe cultivation technology to Ultur and agricultural machinery, decreases the area of arable land per capita from year to year. [1,2,4].

If the share of arable land allocated to one person in 1959 was 0.36 hectares, this figure was 0.23 hectares in 1970, 0.21 hectares in 1979, and 0.155 hectares in 2006 [1,3]. Sixty percent of the territory of the entire territory is located in the mountainous part of the Republic. Because of the impact of natural and anthropogenic factors, one can also meet all types of erosion [5].

On the basis of the results of our numerous studies on the patterns of development of land degradation problems and even the landscape in some regions, the erosion process is very widespread (especially in mountainous terrain) in the country.

At present, more than 42.8% of the entire territory of the Republic and 70–85% of some regions suffer from different degrees of erosion [5, 6]. One of the biggest factors of water and irrigation erosion. In addition to furrow irrigation and irrigation, agronomic measures, irrespective of the protection of land, agriculture, horticulture or livestock, cause soil erosion [2,7].

However, the country faces acute water shortage conditions. The country's water resources are 32.5 billion m³. In low-water years, this figure decreases by 23.16 billion. M³. The volume of water resources in the country is only 30%, and the remaining 70% flows through neighboring countries [4].

Notably, in the face of constant water shortages, the sharply uneven distribution of water in the country, despite the economic and environmentally effective irrigation of crops, is not primitive, traditional or pouring carried out by irrigation.

The results of the study revealed that up to 96% of irrigated land is watered mainly by traditional methods of irrigation (furrows and overlapping) via surface methods, and the remaining 5% is watered via progressive water-saving low-intensity irrigation systems.

Therefore, in fields, the level of groundwater increases every day. In fact, in a number of areas, underground water and arable land suitable for approximately 1000 thousand hectares have been salinized, which has caused particular danger in violation of the country's ecological balance.

Currently, more than 53 thousand hectares of sown areas of the Kura-Araks lowland suffer great danger as heavily saline soils due to flooding, where homestead plots of the populations of these regions of Azerbaijan leave crop rotations where

thorough cleaning of those soils from life-threatening salts of various kinds is needed. [2,4,6].

The results of the monitoring studies revealed comparative indicators for the water supply in 3 Transcaucasian states, namely, Georgia, Armenia and Azerbaijan, which are followers of 70, 25 and 10 billion km³ of water resources, respectively. The annual per capita water resources in these countries are 11000, 3000, and 1500 m³/person.

Research in 2020 revealed that the annual water resources per capita of Azerbaijan are 2 times less than those in Armenia and 7 times less than those in Georgia. Water resources are believed to be very important in the development of the economy of each country, especially in the industrial-production sphere, and agriculture is a key element of life.

Degrees of soil erosion caused by erosion and methods used to reduce the degree of soil erosion caused by erosion in Azerbaijan

Degree 1 - weak erosion - meets mainly in the form of surface washout invisible to the eyes. Its traces, in the form of small ruts and sediments, are easily aligned in the process of agro-technical processing of soils.

Degree 2 - moderate erosion - manifests itself in the form of ruts and changes the level of humus in the soil, reducing its amount and worsening the physicochemical properties of soils. This process does not affect the formation of the relief.

Degree 3 - medium erosion - intensely destroys the arable-humus layer, even reaching the parent rock. Ravens and grooves are numerous and deep and cannot be corrected as a result of the processing process, resulting in the formation of undulating slopes.

Degree 4 - severe erosion - destroys the entire soil profile, ruts and grooves are formed, which increasingly enter the layer of the parent rock. As a result, there is a so-called erosion landscape with a characteristic breakdown of the soil cover and the formation of ravines.

Degree 5 - very strong erosion - blurs the entire soil profile, together with part of the foot.

This leads to strong fragmentation of the soil cover, the creation of a dense network of gullies, and the transformation of agricultural territory into junk land.

Degrees of soil destruction by wind erosion:

Degree 1 - Weak erosion is caused by a small blowing from the soil of the best and most valuable colloidal, clay and dust particles. Blowing practically does not affect the condition of the soil;

Degree 2 - moderate erosion begins to limit, to some extent, the humus of the soil due to the blowing out of a large number of mineral and organic components, in contrast to weak erosion.

Degree 3 - average erosion can significantly reduce the humus content due to the significant amount of mineral and organic particles present and can cause damage to crops.

Degree 4 - severe erosion leads to changes in the soil profile. These soils are subject to strong blowing and have a clearly reduced level of humus, which accumulates in the wind deposits.

Degree 5 - very strong erosion leads to the formation of dunes. Strongly eroded land should be completely covered with forests.

Assessment of the State of Water and Land Resources in Azerbaijan Such presentations became the basis for the development of a program to protect land from erosion degradation for the whole country.

Large-scale accounting was conducted only in those places for which plans or projects for development and organization of the economy are being developed. This model does not allow for this. 1.

RESEARCH METHODOLOGY

Degrees of soil destruction by wind erosion: To study the distribution areas and intensity of erosion process development, we used field and laboratory methods. The phenomenon of soil erosion and the areas of its distribution are relatively geographically, stationary and semistationary.

The determining role of terrain in the development of soil erosion is well known. The most pronounced factors affecting the nature of mountainous areas are the slope of the surface, the depth of local bases and the exposure of slopes.

Therefore, on the basis of topographic maps at a scale of 1:50,000, the same name map of erosion factors was compiled for the study area.

When a map of surface slopes was drawn, the following gradations were adopted: 0--30; 3--50; 5--70; 7-- 100; 10--150; 15--200; 20--250; 25--300; 30--450; and more than 450. For the distribution of land along the slopes of the surface, indicators of the average weighted slope value were proposed by M.N. Zaslavsky (1979):

$$Ж_{ср.взв} = 100 \frac{1 \cdot 1 + 2 \cdot 2 + \dots + n \cdot n}{1 + 2 + \dots + n}$$

where $\bar{K}_{cp.взв}$ is the average weighted value of slopes K_1 and K_2 . In the slope of the outlined contours, C_1 ; C_2 ; S_n is the area of allocated contours, % of total area. [2,7]

Maps of the depths of local erosion bases were compiled with definitions of the excess watersheds above the riverbeds and their tributaries, as well as large ravines and suhdalis.

To compile this map, the following gradations were adopted: 0--50; 50--100; 100--150; 150--200; 200--250; 250--300; 300--400; 400--500; and greater than 500 m. [5]

The map of the slope exposure is compiled on a topographic basis and is distinguished: northern, northeastern, northwestern, eastern, southern, southeast, and southwest exposures. To carry out the soil erosion studies, the S.S. Sobolev classification was used (the description of which is given in the book of I.F. Sadovnikov 1954).

Taking into account this classification, the soils in terms of degree of erosion were distinguished as follows:

1. Undiluted soils—there are all genetic horizons, and destruction is not observed;
 2. Weakly washed soils—no more than half of humus horizon A is washed away, and jet erosion is observed on the soil surface.
 3. Medium-washed soils—more than half of genetic horizon A is absent.
 4. Strongly washed soils—horizon A is completely washed away, and horizon B partially overlaps.
3. Improvement of eroded soils of pastures of Azerbaijan The territory of the Republic of Azerbaijan is located in the eastern part of the Trans Caucasus, which includes the Greater and Lesser Caucasus regions, the Talysh zone, and the Kura depression.

The total area of the Republic is 86.6 thousand km²; approximately 40% of the land area is made up of plains, and the remaining 60% is foothill and mountainous. The climatic conditions of the republic are diverse, as a mountainous country, the republic at the same time possesses vast lowlands and valleys, and owing to the diversity of the relief surface, it has a diverse RAE.

The main Caucasian ridge protects the republic from the invasion of cold air masses from the north. The climatic conditions vary with altitude. With increasing mountains, the average air temperature decreases. Among the 11 types of climates established on Earth's globe, 9 are climate types; there are no savannas or tropical forests.

The typical types of soils are mountain meadow sod soils, mountain forest soils, gray-brown soils in the foothills and foothill plains, gray-brown soils in the arid zone, and yellow silts in the Talysh zone. The small area of the Republic has a variety of natural conditions and rich natural resources. One of the natural resources in Azerbaijan is pasture. The area of pastures in the Republic of China is 22.3% of the total area. The number of summer pastures is 621 thousand hectares; the number of winter pastures is 1.5 million hectares, and the number of priselsky pastures and hayfields is approximately 1 million hectares. The Republic of Azerbaijan from ancient times is distinguished by the livestock sector. Our region, which is rich in natural pastures and pastures located in alpine zones, is a natural resource. However, due to various circumstances, including soil erosion, these natural forage resources lose their potential fertility. One such circumstance is soil erosion.

Erosion is destruction, and erosion, as a geological term, is the destruction of the upper fertile soil layer under the influence of wind and water. The upper layer of the Earth's crust has undergone various changes as a result of various processes. This process can proceed as a normal phenomenon of nature and can also occur intensively as a result of anthropogenic loads. In any of the 2 cases, the topsoil is flushed. Regardless of the type of erosion, the most developed fertile upper accumulative horizon is carried away. Along with water flows and a solid phase of soils, nutrients with a finely dispersed fraction are carried away, and depending on the degree of erosion, the damage caused by erosion is different. Notably, in addition to water erosion, the occurrence of wind erosion-deflation is also high. Wind erosion intensively manifests itself in arid zones, where a dry climate, an increased wind regime, and insignificant precipitation contribute to the degradation of vegetation cover.

The intensity of the development of wind erosion in comparison with that of water erosion is low. However, the damage caused by wind erosion to agriculture is enormous. Wind erosion on one side promotes the blowing of the soil; on the other hand, the accumulation of particles in the form of a hill and moving sands fill with vegetables, gravel crops, roads, construction sites, and squally winds tear roofs off houses. Natural fodder lands located on eroded slopes have low productivity. Winter pastures of dry lands do not provide livestock with quantitative and qualitative feed. Methods for improving natural hay fields and pastures are divided into 2 main groups: superficial and radical improvements. By superficial improvement, measures for keeping hayfields and pastures in a cultural state and increasing their yield without disturbing the natural turf are needed. The system of superficial improvement of natural hayfields and pastures aims to improve the water, air and food regimes and care for the grass stand for the longest time to keep fodder in a state of economic value. Surface improvement is advisable in meadows, where 20–25% of valuable forage grasses are preserved in the grass stand. On hayfields and pastures with aworse herbage, a superficial improvement does not provide the proper effect, and a thorough investigation should be carried out.

CONCLUSIONS

The goal of solving problems of resource savings in the conditions of a new form of management in a market economy with the use of advanced water-saving irrigation technology for agricultural production, which is the basis of the regional water strategy for the development of water and land resources in the republic and their management, requires a comprehensive analysis and assessment of the following factors: their potential land productivity, the degree of potential erosion and agroecological availability and quantitative assessment of the water balance (its deficit arid years); specific water consumption with minimum water consumption for agricultural production; ensuring the maximum reduction of unproductive costs in the irrigated fields and the discharge of return water into rivers and ponds and waterways and improving water quality; and the creation of public bodies to control water use at all levels of management.

References

- [1] Aliyev Z.H. Aerospace monitoring of soil cover dynamics//Aerospace methods in soil science and their use in agriculture. - Moscow: Nauka, 1990. - P. 55-60.
- [2] B.H. Aliyev, Z.H. Aliyev, A.Dj. Musayev, A.A. İbrahimov. Dangerous erosion of the mountain zone and ways to increase the efficiency of agriculture land eroded. Baku2003. 80 p.
- [3] Aliyev, Z. H., & Djafarov, A. B. (2009). Agroecological assessment and grouping of pasture lands of Azerbaijan, Sat. Scientific works of the SRI GTM 29th volume Iftu, 133-139.
- [4] Vinogradov, B. V. (1984). Aerospace monitoring of ecosystems//Moscow: Nauka, p. 320.
- [5] Vinogradov, B. V. (1984). Aerospace monitoring of ecosystems//Moscow: Nauka, p. 320.
- [6] GyulalyevCh.G. Kozlova A.A. Physical properties of virgin and arable soils//Belarusian Geographical Society, Belarusian Society of Soil Scientists" Soils and land resources: current state, problems of rational use, geoinformation mapping" Minsk, 2018., p. 60-65Zaslavsky M. Erosiology, Moscow, Higher School Publishing House, 1963 st.212.
http://www.pochva.com/?content=1&query=%20&by=all&format_search=d&n=49
- [7]. Garaizade A.P., Gulaliyev Ch.G. Heat-physical properties of soils. Baku, Adiloglu, 2006, 204 p.
- [8]. Gulaliyev Ch.G. Thermal-electrical, hydrophysical properties of Azerbaijani soils and their practical significance. Baku "OPTIMIST" LLC printing center - 2021, p.360.