Agricultural and Biological Sciences Journal
Vol. 7, No. 3, 2021, pp. 51-56
http://www.aiscience.org/journal/absj
ISSN: 2381-7178 (Print); ISSN: 2381-7186 (Online)

Ways of Effective Use of the Municipal Land Fund of the Shirvan Steppe of Azerbaijan

Leyli Rashid Kizi Karimova*

Department of Land Management and Cadastre, Faculty of Ecology and Soil Science, Baku State University, Baku, Azerbaijan

Abstract

After gaining state independence, land reforms began to be carried out in the Republic of Azerbaijan, as a result of which three types of property were created on the land fund, previously belonging only to state property - state, municipal and private. After that, for the rational use of land resources, their assessment began to have both scientific and theoretical and industrial significance. Taking this into account, we carried out an assessment of the municipal land fund of the Shirvan plain in order to develop the basics of effective use of these soils. Municipal lands of the Shirvan plain of the Republic of Azerbaijan with a total area of 265693.66 hectares were taken as the object of the study. The level of soil fertility was analyzed and determined on the basis of generally accepted methods, bonitet points were calculated based on the methods of Karmanov, Bulgakov and Mamedov. To achieve this goal, a number of works were carried out: the level of soil fertility, the degree of erodification, salinity and solonetsification of municipal lands included in the territory of the Shirvan plain was determined; the weighted average bonitet score of the territory was calculated, a structural map of the municipal land fund of the Shirvan plain was compiled, ways of rational use of municipal lands were investigated, and a set of agrotechnical and reclamation measures for its improvement was developed.

Keywords

Munisipial Soils, Land Use, Erodification, Salinity, Average Bonitet Score

Received: May 10, 2021 / Accepted: July 22, 2021 / Published online: July 26, 2021

1. Introduction

The acquisition of state independence in our country has led to fundamental changes in all spheres of sociopolitical and socioeconomic life. In 1996, our country adopted the Law of the Republic of Azerbaijan "On Land Reform", which laid the foundations for land reform in our country [1]. Before the land reform in our republic there was only one form - state ownership of the land fund. After the reform, 3 types of land property were created on the territory of the republic - state, municipal and private. Due to the importance of determining the price of land when buying, selling, renting, mortgaging, and so on, it became necessary to evaluate these lands, as well as developing new scientific and theoretical methods for land assessment.

In order to obtain high yields in agriculture, the issue of conducting research on the valuation of the private land was raised as relevant. For many years, the intensive use of privately owned land, both rain-fed and irrigated, has increased the anthropogenic impact on the soil, which has led to increase soil degradation to varying degrees. It should be noted that 90% of municipal lands in our country are pastures, and the anthropogenic impact on them is small compared to arable land.

The use and protection of land transferred to municipal ownership is directly entrusted to local governments. Thus, the municipalities were instructed to use the lands allocated to the municipality for their intended purpose, to prevent their unjustified withdrawal from circulation, the removal of

* Corresponding author
E-mail address: mehluqe_yusifli@mail.ru

fertile soil from the designated sites during construction, and then transferring it to less fertile areas, the protection and preservation of soil fertility in other territories is assigned to the municipalities. In addition, a number of measures, such as protecting land from natural and anthropogenic impacts, transferring land to private ownership, using and renting, informing the population about lands in civil circulation, are also within the competence of municipalities.

A change in the designated purpose of land owned by municipalities is allowed on the basis of a decision of the Cabinet of Ministers in accordance with legislation. Lands that are less suitable and unsuitable for agriculture, owned by the municipality, are leased to individuals and legal entities, and their purpose can be changed after the tenants make the land useful.

For completeness of the analysis, we have carried out a brief analysis of the studies of foreign scientists on the use of the municipal lands [2-7].

2. Materials and Methods

The object of the study is the municipal lands of the Shirvan plain of the Republic of Azerbaijan, with a total area of 265693.66 hectares. In the course of the research, 30 soil sections were delivered on the Shirvan plain, then these samples were analyzed in the laboratory on the basis of generally accepted methods and the properties of soil fertility were determined [8]. Salinity, solonetzicity and erosional state of the soils of the territory was determined on the basis of salinity and erosion maps. According to the methods of Karmanov [9], Bulgakov [10] and Mammadov [11], the bonitet points of soils were calculated.

3. Analysis and Discussion

The Shirvan plain covers the northern part of the Kura-Araz lowland of the Republic of Azerbaijan and is located between 40005 'and 40045' latitude and 47015 'and 49030' longitude. The Shirvan plain is bounded in the north, northwest and northeast by the foothills of the Boz and Langabiz mountains, in the south and southeast by the Kura river, in the east by the conventional meridian 49030, in the west by the lands of the Yevlakh region. The height does not exceed 50-100 m above sea level. At the threshold of the mountains, the slope of the earth's surface ranges from 0.01 to 0.03. The slope of the site on the Shirvan plain from northwest to southeast is 0.00018 [12].

The area consists of gentle plains from the northwest and north to the south and southeast. The earth's surface is characterized by a few minor ascents and descents. In some parts of the plain, the land surface is below sea level. The height of the terrain from the slopes of the mountains is 125 m (Goychay) and 165 m (Agsu).

As for the soil-forming rocks, the main part of the plain is composed of modern sediments. Genetic deposits are classified into three types: alluvial, alluvial-proluvial, and deluvial. Sediments more than 5 m thick serve as soil formation and rock bottom and exist as a reclamation object. The climate of the Shirvan plain is moderately hot semi-desert and dry steppe with dry summers.

The rivers Alijanchay, Turyanchay, Goychay, Girdimanchay and Agsu occupy the main place in the hydrography of the area. These rivers originate at an altitude of 2000-3500 m from the southern slope of the Main Caucasus. 40-50% of the river's sources of nutrition are rainwater, and 50-60% is ground water [13].

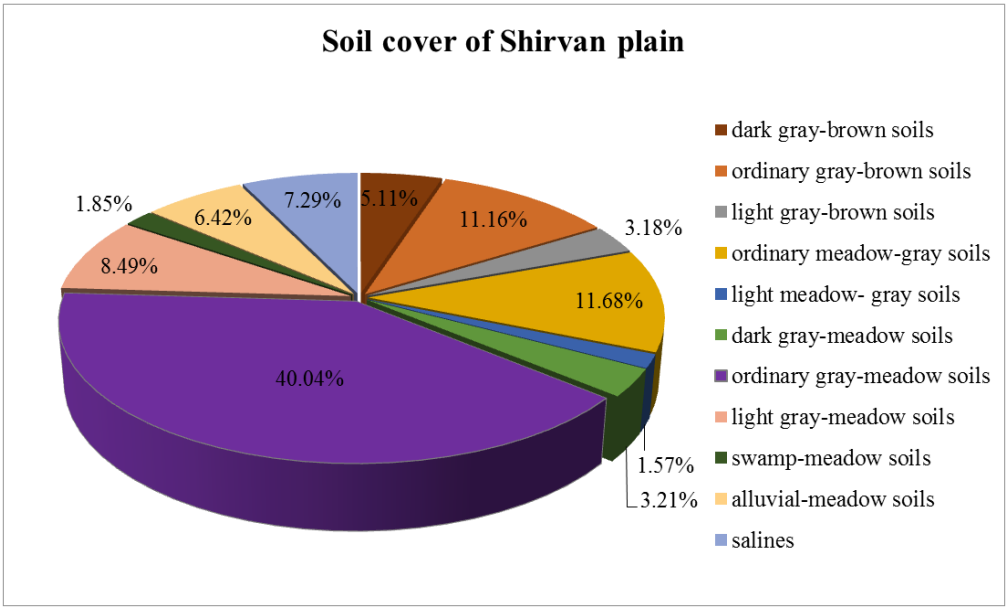

Figure 1. Distribution of Shirvan plain soil cover.

The flora of the region consists of semi-arid and arid steppe groups developing in an arid climate. Here, Tugai forests, groups of blackberries, blackberries-wormwood, and wormwood replace each other [14]. According to many researchers, there are 4 zonal types and 12 phytocoenological formations of plants on the Shirvan plain. Salt-tolerant and drought-tolerant plants prevail among them. These are mainly desert, semi-desert, semi-meadow, marsh and forest plants.

According to our map, the total area of soils located on the municipal lands of the Shirvan plain is 265693.66 hectares [15]. According to the data of fund, literary, cartographic and personal field studies, the following types or subtypes of soils are widespread on the Shirvan plain: dark gray-brown soils - 12,624.69 hectares (5.11%); ordinary gray-brown soils - 27578.95 ha (11.16%); light gray-brown soils - 7867.21 ha (3.18%); ordinary meadow-gray soils - 28849.64 hectares (11.68%); light meadow-gray soils - 3869.24 hectares (1.57%); dark gray-meadow soils - 7936.55 hectares (3.21%); ordinary gray-meadow soils - 98,916.69 hectares (40.04%); light gray-meadow soils - 20,967.27 hectares (8.49%); swamp-meadow soils - 4572.91 hectares (1.85%); alluvial meadow soils - 15,867.8 hectares (6.42%); salines - 17981 hectares (7.29%) [16].

According to the materials of the distribution of Shirvan plain lands by forms of ownership, the total area was 661991.94 ha, of which 198182.66 ha belong to the state, 265693.66 ha to the municipality, and 198115.62 ha to private property.

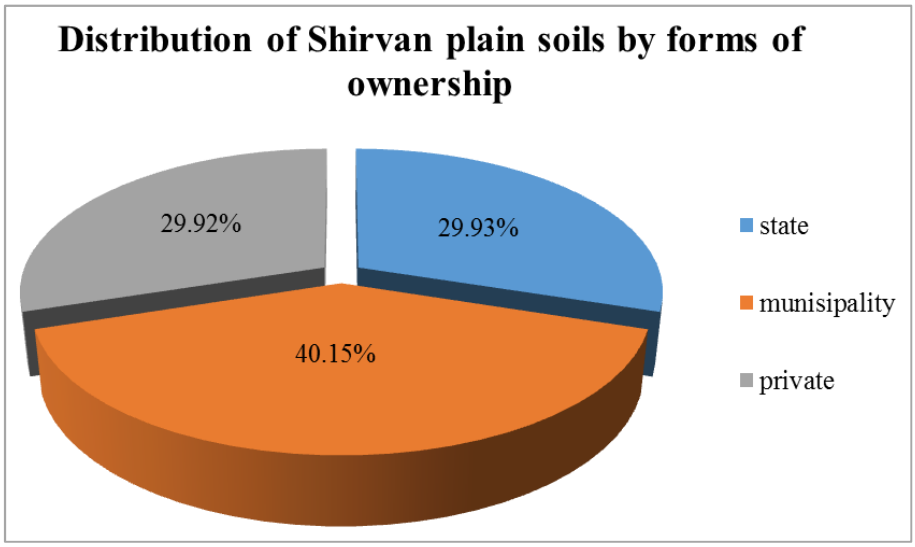

Figure 2. Distribution of Shirvan plain soils by forms of ownership.

Studies have shown that most of the land in this area is subject to natural processes such as erosion, salinization and solonetzification. Information on eroded, saline and solonetz soils of the territory is presented in the following tables.

Table 1. Information on soil salinity of the territory.

№№	District name	Total area of districts, ha	Study area of districts, ha	Degree of salinity					
				Non-salted	Slightly saline	Medium saline	Strongly saline	Very strongly saline şorlaşmış	Salines
1	Agdash	102003	24278	124	546	3200	5153	7950	6203
2	Agsu	102407	52136,14	41268,14	4055	3950	1300	112	-
3	Goychay	70281,45	38469	26505	1250	3564	3001	2817	128
4	Kurdamir	160520,97	62105	1456	8428	23350	13556	7605	3400
5	Ucar	85381,52	33074,88	1743,88	2000	10400	9510	6500	1810
6	Zardab	84800	36968,93	1250	4936	8191,93	9647	5525	6440
Total		605393,94	247031,95	72347,02	21215	52655,93	42167	30509	17981

Based on the results of the study, we came to the conclusion that non-saline soils are mainly located in Agsu, highly saline soils - in Agdash. There are no salt marshes in Agsu. Weakly solonetzic soils are mainly found in Zardab, and non-solonetzic soils - in Goychay region. Medium alkaline soils are found in the Aghsu and Ujar regions. It has been established that weak and moderately eroded soils are observed in Kurdamir, Ujar and Zardab district. Erosion in the area was not serious, was basically a moderate or mild. Erosion was mainly observed in Aghsu and Kurdamir districts [17].

Table 2. The degree of solonetzicity of the territory.

№№	District name	Total area of districts, ha	Study area of districts, ha	The degree of solonetzicity		
				not solonetzic	slightly solonetzic	strongly solonetzic
1	Agdash	102003	24278	7526,18	15052,36	1699,46
2	Agsu	102407	52136,14	50572	1564,14	-
3	Goychay	70281,45	38469	23466,09	14618,22	384,69
4	Kurdamir	160520,97	62105	22978,85	34778,8	4347,35
5	Ucar	85381,52	33074,88	9260,97	23813,91	-
6	Zardab	84800	36968,93	6654,41	29575,14	739,38
Total		605393,94	247031,95	120458,5	119402,57	7170,88

Table 3. The degree of soil erosion of the territory.

№№	District name	Total area of districts, ha	Study area of districts, ha	The degree of soil erosion		
				Not eroded	Slightly eroded	Moderately eroded
1	Agdash	102003	24278	21607,42	1942,24	728,34
2	Agsu	102407	52136,14	47965,25	3649,52	521,37
3	Goychay	70281,45	38469	35302,48	3077,52	89
4	Kurdamir	160520,97	62105	62105	-	-
5	Ucar	85381,52	33074,88	33074,88	-	-
6	Zardab	84800	36968,93	36968,93	-	-
Total		605393,94	247031,95	237023,96	8669,28	1338,71

Based on the purpose of the study, we prepared a soil map owned by the municipality and provided extensive information about these soils.

It was important for us to find the bonitet scores and, on their basis, to build the final bonitet scale [18]. The bonitet points were calculated in accordance with the existing methodology, and, at the end, the bonitet scale was compiled. For this, a soil with high fertility characteristics (dark gray-brown soils), which was accepted as a standard and received a score of 100 points. Then, the scores of other soils were found in relation to the standard. After the scores and areas of soil were known, the final bonitet scale for the study area was compiled. The weighted average score obtained after drawing up the final bonitet scale was taken as the average score for the entire territory, as can be seen from the table, the average score was 71.

Table 4. Final bonitet scale of soils of the Shirvan steppe (on the example of municipal lands).

№№	Soils	Bonitet score	Area Ha%	
1	Dark gray-brown	100	12624,69	5,11
2	Ordinary gray-brown	85	27578,95	11,16
3	Light gray-brown	73	7867,21	3,18
4	Ordinary meadow-gray	88	28849,64	11,68
5	Light meadow-gray	76	3869,24	1,57
6	Dark gray-meadow	90	7936,55	3,21
7	Ordinary gray-meadow	71	98916,69	40,04
8	Light gray-meadow	60	20967,27	8,49
9	Swamp-meadow	58	4572,91	1,85
10	Alluvial-meadow	67	15867,8	6,42
11	Salines	19	17981	7,29
Average bonitet score		71	247031,95	100

Degradation of the territory under the influence of natural and anthropogenic factors also leads to desertification of the territory, which can lead to the complete destruction of land. Therefore, reclamation measures are needed on the territory. It is necessary to take protective measures to conserve the territory from natural and anthropogenic influences [19].

Geographic landscapes reserves in our country, especially on the Shirvan plain, are quite high, which has great prospects for the purposeful development of municipalities in the future. In the long term, the growth of the local population will create a constant demand for municipal land for the expansion of settlements into municipalities, for the construction of buildings and facilities of state importance on public lands.

According to our data, as of January 1, 2019, the rate of land per capita from the land fund of municipalities on the Shirvan plain changed within 0.43-0.86 hectares. This, in turn, suggests that in the future, due to population growth, there will be fundamental changes in the legal regime of the municipal lands of the territory [20].

At the same time, there will be a decrease in the area of the reserve land fund of municipalities in the territories allocated for the prospective development of settlements. At the same

time, it is necessary to take into account the deformation of the reserve fund of municipalities in the short-term, long-term or permanent use by individuals and legal entities, as well as less suitable and unsuitable land for agriculture [21]. Thus, it is important to study the structural distribution of the entire land fund owned by the municipality at the district and farm levels.

In connection with the natural population growth in the regions of the Shirvan plain, a number of demographic problems will arise in the future, such as the construction of new settlements, an increase in their socioeconomic well-being, and so on. Considering the population growth in the future, we can say that with the expansion of settlements, less suitable and unsuitable for agriculture lands will be given for housing construction. At the same time, population growth in the future will lead to an increase in demand for agricultural products.

Meeting this requirement also places some responsibility on municipalities. Therefore, we took into account the importance of the possibility of building new settlements in the near future at the expense of the municipal lands of the Shirvan plain and the allocation of land for this purpose. In the future, population growth on the territory of the Shirvan Plain will require the study and identification of suitable land plots for the construction of new residential buildings [22].

Currently, most of the soils in the Shirvan plain is not used intensively and efficiently in agriculture. The use of land in the region is difficult due to the lack of irrigation water due to the low water content of the existing rivers, as well as the presence of re-salinization, alkalinization of soils and other reasons. For this, it is necessary to implement a number of agrotechnical and reclamation measures for the use of land in agriculture.

4. Conclusion

The map of the municipal lands of the Shirvan plain prepared by us can be used as a basis for allocating land for future development. According to our research, the area of municipal property allotted for the prospective development of settlements will increase in the future due to population growth. In this regard, the need for additional land can be met by taking a number of measures for the proper use and protection of land, including significant improvement and introduction of saline, alkaline and eroded soils into circulation.

References

[1] Mammadov G. Sh. (2002). Land reform in Azerbaijan: legal and scientific-ecological issues. Baku: Science: 412 p.

[2] Karamesoutia M., Detsisb V., Kounalakia A., Vasilioua P., Salvatic L., Kosmasa C.(2015). Land-use and land degradation processes affecting soil resources: Evidence from a traditional Mediterranean cropland (Greece). *CATENA*. 132: 45-55 https://doi.org/10.1016/j.catena.2015.04.010

[3] Abrantes P., InêsFontes I., Gomes E., Rocha J. (2016). Compliance of land cover changes with municipal land use planning: Evidence from the Lisbon metropolitan region (1990–2007). *Land Use Policy.* 51: 120-134. https://doi.org/10.1016/j.landusepol.2015.10.023

[4] Stevens R. M., Maged Senbel M. (2017). Are municipal land use plans keeping pace with global climate change? *Land Use Policy.* 68: 1-14. https://doi.org/10.1016/j.landusepol.2017.07.026

[5] Marinina O. A. (2018). Soil evaluation for land use optimizing. *IOP Conference Series: Earth and Environmental Science* 107: 1-6. doi: 10.1088/1755-1315/107/1/012015.

[6] Fentie S. F., Jembere K., Fekadu E., Wasie D. (2020). Land Use and Land Cover Dynamics and Properties of Soils under Different Land Uses in the Tejibara Watershed, Ethiopia. *The Scientific World Journal.* Volume 2020: 1-12. https://doi.org/10.1155/2020/1479460

[7] Borrelli P., Robinson A. D., Panagos P., Lugato E., Jae E. (2020). Land use and climate change impacts on global soil erosion by water (2015-2070). *PNAS*. 117: (36): 21994-22001. https://doi.org/10.1073/pnas.2001403117

[8] Arinushkina E. V. (1970). Guidance on chemical analysis of soils. Moscow: Publishing House of the ME: 2nd ed.: 488 p.

[9] Karmanov I. I., Bulgakov D. S., Karmanova L. A., Putilin E. I. (2002). Modern aspects of land and soil fertility assessment. *Soil Science*. 7: 850 – 857.

[10] Bulgakov D. S. (2002). Agroecological assessment of arable soil. Moscow: RASHI: 251 p.

[11] Mammadov G. Sh., Jafarov A. B., Jafarov F. Ch. (1997). Soils assessment. Baku: Science: 174 p.

[12] Karimova L. R., Hasanova A. F., Quliyeva Y. N. (2018). Features of the soil cover of winter pastures of the Shirvan Steppe. *Works of the Institute of Soil Science and Agrochemistry*. Baku: Science: 1-2: 179-183.

[13] Yusifova, M. M., Nuriyeva, K. G. (2015). Evaluation of the Irrigative Soils Ecological State in the Garabagh Plain from the Azerbaijan Republic. *International Journal of Agricultural Sciences and Natural Resources*, AASCIT. 2 (3): 52-57.

[14] Agaguliev I. M. (2000). Flora and vegetation of southeastern Shirvan. Baku: Science: 146 p.

[15] Morphogenetic profile of Azerbaijani soils. (2016). Edited by Sh. G. Hasanov. Baku: Science: 359 p.

[16] Babayev M., Ismayilov A., Huseynova S. (2017). Integration of the national land classification of Azerbaijan into the International System. Baku: Science: 272 p.

[17] Babayev M. P. (2017). Desertification-soil degradation and restoration. *Collection of works on Soil Science and Agrochemistry*. XVII: 19-24.

[18] Mindibayev R. A., Kirayev R. S. (2014). Principles and methods for assessing the productive functions of soil fertility and land quality. *Proceedings of the Congress Dokuchaevsky Society of Soil Scientists*. Novosibirsk: 190.

[19] Suleymanov R. Y. (2015). Basic criteria in land valuation. Agroecology of Shirvan steppe municipal lands and their use. "Land resources and protection of Azerbaijan". *Works of the Institute of Soil Science and Agrochemistry*. Baku: Science: X, I: 432-438.

[20] Suleymanov R. Y. (2017) Some issues on ecological problems of Shirvan steppe municipal lands. *Collection of works on Soil Science and Agrochemistry*. Baku: Science: XVII: 155-161.

[21] Babayev M. P., Gurbanov E. A., Hasanov V. H. (2010). Land degradation and their protection in Azerbaijan. Baku: Science: 216 p.

[22] Jafarov T. X. (2017). On the current state of land use in the Shirvan plain. *Collection of works on Soil Science and Agrochemistry*. Baku: Science: XVII: 565-569.