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MANAGEMENT OF STRUCTURAL FUNCTIONAL FEATURES OF SEMI-DESERT LANDSHAFTS OF KARABAKH AND MIL PLAIN

Relevance of the topic. The modern anthropogenic complexes formed in the semi-desert landscapes of the Karabakh and Mil plains during different historical periods are natural-anthropogenic territorial units controlled and regulated by humans, whose structural-functional characteristics and productivity are constantly kept under control. Anthropogenic effects should be in the center of special attention in the management of structural and functional features of semi-desert landscapes in Karabakh and Mil plains. Here, special attention is paid to the structure of the agro-irrigation landscapes of the area, the degree of change of the alluvial and delluvial plains, as well as to the soil types.

Due to the semi-desert, dry-desert and various intrazonal landscapes of Karabakh and the Mil Plain, these issues should always be in the center of attention, as they affect the formation and development of agriculture in our republic. The geographical features, soil and climatic conditions of Karabakh and Mil Plain were studied, and the current state of irrigation systems of the region was analyzed in this article,

Research methodology and methods. In addition to the natural soil resources of the mentioned area, the article provides information about the saline soils. Here, irrigation systems, which have a special place in irrigated agriculture, and the construction and importance of canals are analyzed. The hydrogeological conditions and humidity conditions of the area are especially mentioned. For this purpose, along with the geographical features of the studied area, statistical indicators on the current state of irrigation systems, scientific works on the subject were also used.

The main *scientific innovation of the research* is that the anthropogenic complexes formed in the semi-desert landscapes of the Karabakh and Mil plains were extensively analyzed in the article as natural-anthropogenic territorial units controlled and regulated by humans, whose structural-functional characteristics and productivity are constantly kept under control.

The main scientific result of the study. Modern anthropogenic complexes formed in the semi-desert landscapes of Karabakh and Mil plains during historical periods are natural-anthropogenic territorial units controlled and regulated by people, whose structural-functional characteristics and productivity are constantly kept under control. Systematic study of the Karabakh and Mil plains and preparation of recommendations to increase their productivity are of great importance in the socio-economic development of our country.

Keywords. Structural-functional, agroirrigation, landscape, anthropogenic, hydromelioration, salinity, delluvial, alluvial.

Introduction. The semi-desert landscapes of Karabakh and Mil plains have been differentiated as a result of anthropogenic influences. Anthropogenic complexes formed during different historical periods are currently undergoing changes. We should especially note that the greater part of the Karabakh plain remained under the enemy's feet for thirty years. During these years, the natural landscape of that area has been brutally destroyed. Since the Karabakh and Mil plains are important regions for agriculture in general, it is important to implement a plan of special melioration measures in these areas.

Relevance of the topic. The modern anthropogenic complexes formed in the semi-desert landscapes of the Karabakh and Mil plains during different historical periods are natural-anthropogenic territorial units controlled and regulated by humans, whose structural-functional characteristics and productivity are constantly kept under control. Anthropogenic effects should be in the center of special attention in the management of structural and functional features of semi-desert landscapes in Karabakh and Mil plains. Here, special attention is paid to the structure of the agro-irrigation landscapes of the area, the degree of change of the alluvial and delluvial plains, as well as to the soil types. Due to the semi-desert, dry-desert and various intrazonal landscapes of Karabakh and the Mil Plain, these issues should always be in the center of attention, as they affect the formation and development of agriculture in our republic. The geographical features, soil and climatic conditions of Karabakh and Mil Plain were studied, and the current state of irrigation systems of the region was analyzed in this article,

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extensively analyzed in the article as natural-anthropogenic territorial units controlled and regulated by humans, whose structural-functional characteristics and productivity are constantly kept under control.

Literature review. Mahmudov.R.N (2003) in his work entitled "Water resources of the Republic of Azerbaijan" provided extensive information about the sources of Azerbaijan's rivers and the level of irrigation use of rivers, as well as the importance of irrigation canals drawn from these rivers. Here, the annual water transfer capacity of the irrigation canals in the area is explained according to the historical development of irrigation agriculture in the Karabakh and Mil plains. In addition, the reasons for the seasonal change in the groundwater level are shown. In order to prevent salinization, the rules for irrigation of agricultural fields are indicated. In the work, directions for the systematic restoration of the supply of irrigation canals and collector drainage systems in the Mil and Karabakh plains are indicated. B. Budagov and Y. Garibov "The main directions of anthropogenization of natural landscapes" (2000) provide detailed information about the differentiation of natural landscapes. The authors specifically comment on the planned alteration of the relief of the plains by humans into agricultural fields and garden plantation landscapes. In the work, extensive information is provided on the differentiation of semi-desert landscapes and intozonal landscapes of the Karabakh and Mil plains. Even here, the level of development of modern anthropogenic landscapes is shown. The transformation of Karabakh and Mil plain landscapes was analyzed step by step. In particular, the degree of salinization of soil types and measures to be taken against salinization are indicated. As agriculture develops in the Karabakh and Mil plains, the increase in collector drainage systems and the conversion of large areas into agricultural fields indicate an increase in anthropogenic activity from year to year. In the work, it is also clearly shown which areas need land reclamation work. M.A. Museyibov`s literature "Landscape of the Republic of Azerbaijan" has fully and clearly explained the common landscape types in Azerbaijan and the areas where these types are spread. The negative and positive aspects of changing the landscape types common in the Karabakh and Mil plains have been discussed. Ways of optimizing anthropogenic factors in landscapes are also reflected in the work. Climatic elements of landscape types and the impact of global warming are specially mentioned. The amount of precipitation by landscape types is also shown.

Structure of agro-irrigation landscapes in Karabakh and Mil plains. Agroirrigation landscapes in Karabakh and Mil plain cover more than 294 thousand hectares. Grain, vegetable, melon, dry-subtropical fruit-growing and cotton crops are spread on moderately and weakly saline Gray-Meadow, Meadow-Gray, alluvial-Meadow, light-gray brown soils in the agroirrigation landscapes of alluvial, alluvial-proluvial, alluvial-delluvial plains [3, p. 85]. Semi – desert, dry-steppe and various intrazonal landscapes of Karabakh and Mil plain are one of the important grain-growing, vegetable-growing, cotton-growing, dry subtropical fruit-growing, horticultural and viticulture bases of our republic. Karabakh and the Mil plain are a sharply mastered, fundamentally transformed region, complicated by many re-derivative types of natural-anthropogenic modifications. This region is one of the most common areas of our republic with planned, regulated and managed agrocomplexes and has its own regional differences [7, p. 215]. There is a peculiar pattern of anthropogenization of modern landscapes-arable land, garden - plantations, saltpeter complexes, various infrastructures. Poorly changed, irregularly affected landscapes cover semi-desert, intrazonal and dry-steppe landscapes hilly-Tugay-forest, forest-meadow, swamp, salinity, swamp-meadow, water-meadow landscapes and winter pastures of weakly inclined plains. Sharply changed, regularly affected landscapes cover bumpy, hilly, wavy, chalky, agroirrigation, garden-plantation, seliteb complexes in plains, import cones, inter-conical plains. Fully transformed landscapes, constantly exposed to various man-made disruptive effects, include man-made urban complexes of smooth, hilly, weakly inclined plains, hydraulic structures, artificial water bodies, canals and collectors, highways and railways, power lines, and other man-made complexes [5, p. 142].

Landscapes which have been sharply changed, completely changed by complexes are dominated in the Karabakh and Mil plains, and they are subjected to regular impacts, and are constantly subjected to various man-made influences. In addition to these anthropogenic complexes, marshes, salinas, desertification hotbeds formed as a result of long-term economic and household impacts of people cover a large area. The role of anthropogenic factors in the formation and development of swamps, salinities and desertification hotbeds is great here. In the Karabakh and Mil plains, marshes and saline areas are formed as a result of the activity of mineralized groundwater. The groundwater level in the area is gradually decreasing from the foothills up to the riverside of the Kura. This pattern is often violated by the influence of buried ascents and watering [6, p. 138]. The depth of groundwater up to 1 m includes the Kura and Araz River areas of Aghjabadi, Sabirabad, Imishli, Saatli districts. The location of groundwater in such a large area very close to the surface has led to a sharp rise in the level of the Kura and Araz rivers in recent years, especially after 2010, flooding and waterlogging of the surrounding areas. In 70 – 80s of XX century depth

of groundwater in the places of riverside of the Kura along Mil plain was more than 3 m. After the last floods of the Kura and Araz rivers, flowing little lakes were formed in the lowlands. Although the vast majority of these waters were discharged into the Kura and Araz rivers through collectors, it was not possible to lower the groundwater level below 1 – 2.5 m in many places. As irrigation canals are laid in the region, there is a sharp increase in groundwater levels. The approach of mineralized dry waters to the surface in the central plains and along the Kura accelerates the processes of waterlogging and salinization.

Land resources of Karabakh and Mil plains. The formation of desertification hotbeds in the Karabakh and Mil Plains is influenced by the close location of saline dry waters of the area, erosion, drying, waterlogging processes, the development of agricultural areas, Industry, population settlement. Salinization of soils has become widespread in most of the desertification hotbeds. Of the total irrigated lands (296736 ha) of the Karabakh and Mil Plains, 145191 ha was not saline. Salinized soils (151545 ha) were exposed to 91906 ha of weakly salinized soils, 38681 ha of moderately salinized soils and 20958 ha of severely salinized soils [1, p. 88]. 337416 ha of the region`s land resources fall to the share of driving pastures and pastures. These areas, which are mainly used as winter pastures,are widely used both by the region`s own districts and by other districts of the Republic in nomadic and semi-nomadic cattle breeding, especially sheep breeding. Of the land resources in the region, 269649 ha is used in agriculture, 226347 ha is used in other areas, 44130 ha of land covers backyards and underforested land (figure 1).

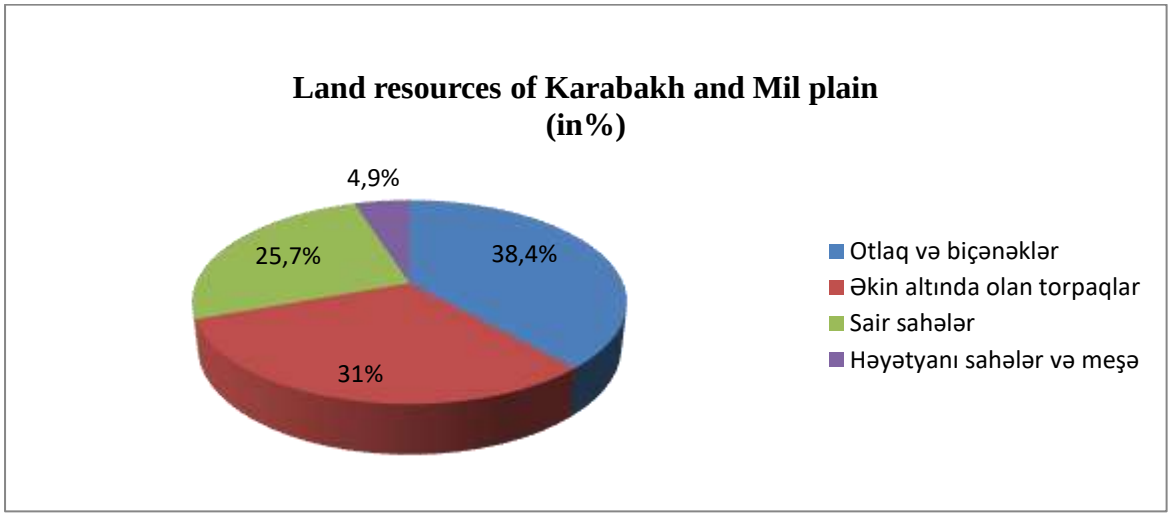

Figure 1. Land resources of Karabakh and Mil plain (in%)

The main features of the formation of agro-irrigation landscapes in the Karabakh and Mil plains. Karabakh and Mil plain are one of the main irrigated agricultural regions of the Republic of Azerbaijan. In the study of agroirrigation landscapes, along with anthropogenization of individual landscape units, natural and artificial decomposition of the relief, hydrological and hydrogeological conditions, in particular, the degree of mineralization and seasonal dynamics of groundwater, the thickness of the agroirrigation layer on the soil cover, the characteristics of cultivated plants, species composition and vegetation, productivity, etc. factors must be taken into account. Agroirrigation landscapes and irrigation systems in the Karabakh and Mil plains were founded before our era. This is evidenced by the traces of irrigation canals in the Karabakh and Mil plains that have survived to this day. Since ancient times, due to the development of irrigation agriculture, microalgae and microenvironments of anthropogenic origin have appeared in the regional relief. As a result of perennial irrigation,meloration, landforms of anthropogenic origin occupy large areas. *Aqroirriqasiya landşaftlarının yaranmasıda hidroloji və hidrogeoloji amillərin rolu.* The emergence of agroirrigation landscapes is highly dependent on hydrological and hydrogeological factors. The historically developed, territorial structure, formation and high productivity of these landscapes depend on the degree of subsoil and surface water supply of the region. The impact of people on the hydrographic network is carried out through irrigation, construction of reservoirs, equipping territories with water, various ameliorative measures [5, p. 142]. The meloration measures taken are aimed at increasing the productivity of soils, their more efficient use. Due to the meloration measures carried out in the Lowland and irrigation works, artificial fragmentation has intensified in the area. In the central and southern parts of the mile plain, artificial fragmentation has a higher quantity. Artificial decomposition here is 2.0-2.5 km/km2 and more. Due to the large number of tributaries of various directions from irrigation canals in the

mile plain, the artificial surface degradation in these areas is very high, and in most areas it reaches 3.5-6 km/km^2 or more. Artificial surface degradation in the central parts of the Karabakh and Mil Plains has the lowest performance. The reason for this is the poor development of irrigation agriculture in those areas.

Main canal and irrigation systems of Karabakh and Mil plains. The agrolandshafts formed in the area have a history of irrigation. Since the second half of the XX century, a number of main irrigation canals, reservoirs and water junctions have been built in this region. The region`s largest irrigation system, the Upper Karabakh canal, extends from the Mingachevir reservoir to the Bahramtapa water junction. More than 200 different hydromelorations have been built on this irrigation canal. The main Mil canal, which starts from the Mil-Mugan water junction, irrigates the agrolandsafts of the Mil plain. (table 1).

Table 1.

Main channels of Karabakh and Mil plain

Channels	*Date of commissioning*	*Length (km).*	*The area irrigated (ha).*	*Water release capacity (m3/sec.).*
Upper Karabakh	1958	172	76 thousand	130
Main Mughan	1960	37	68 thousand	55
Main Mil	1976	38	64 thousand	93
Named after Azizbeyov		123	69 thousand	

In 1950-1958, the Bahramtepe hydro junction was built on the Araz river. The Bahramtepe hydrojunction receives water from the Araz river and transfers 2049.68 mln. m^3 or 70.14 m3/sec water to irrigation canals every year. Water from this junction is used to irrigate the lands of the Mil plain as well as the Mugan plain. More than 120 canals, large inter-farm distribution canals have been built from the main trunk canals of the Mil plain. Through them, more than 100,000 ha of agro-irrigation landscapes of the region are supplied with irrigation water to varying degrees [4, p. 23]. "Irrigation relief" is created from the accumulation of agro-irrigation in the areas of Karabakh and Mil plains that have been irrigated for many years. Its thickness reaches 1-2 m in complexes that have been irrigated since ancient times. At the beginning of the 20th century, since the canals drawn from the Kura River did not have water collecting collectors, the irrigation water went to Mahmudchala, Mehman, Sarisu, etc. it poured into swampy areas and lakes. As a result, a large part of the Karabakh and Mil plains has turned into a reed swamp. In the 50s and 60s of the 20th century, most of the wetlands were drained as a result of reclamation measures [6, p. 138]. A dense collector-drainage network has been created in agroirrigation landscapes of Karabakh and Mil plain. The main Mil-Karabakh collector was built in the Mil plain, and as a continuation of this collector, the main Mil-Mugan collector extends along the Mughan plain. According to the information of the Institute of Water Problems of the State Water Management and Meloration Agency, the irrigation rate is set at 6000-7500 m3/year per hectare in the arid regions of Karabakh and the Mil plain, where the humidity coefficient is less than 0.2. In the foothills of the Mil plain, where the humidity coefficient is 0.2-0.3, the irrigation rate should be 6000-6500 m3/year per hectare. The irrigation rate varies depending on the characteristics of natural complexes. June, July, and August, when average monthly temperatures are higher, receive very little annual precipitation, and severe drought makes it difficult for agricultural crops to thrive. Therefore, in order to ensure the high development of agrocomplexes, they should be given water in the amount of 6000-7000 m 3 during the irrigation season. If that water is given by the traditional irrigation method, it is necessary to irrigate the military territory complex at least 10-15 times a year. The number of watering depends on the characteristics of natural landscapes, degree of drought, weather conditions, etc. it depends. Cotton, grain, vegetables, melons etc. cultivated in semi-desert landscapes. to ensure the normal development of agro-irrigation complexes, irrigation should be carried out at least 15-20 times a year. Agro-irrigation complexes formed in dry-desert landscapes should be irrigated 10-12 times during the irrigation season. Irrigation can last up to 2.5-4.5 months, depending on the characteristics of seasonally cultivated plants, duration of vegetation. In the region we studied, irrigation starts from the second half of May and continues until the middle of September. The irrigation season can last up to 6 months in Agjabadi, Beylagan, and Sabirabad regions, where crops are harvested several times a year [2, p. 159]. The semi-desert, dry-desert and intrazonal landscapes of Karabakh and the Mil plain have been replaced by irrigated agrocomplexes since ancient times. Agro-irrigation landscapes are spread in the form of rectangular shape, and in the cones of rivers and deluvial plains in the form of feathers, as well as in the form of geometric figures of various configurations. The surface of the newly developed, irrigated, reclamation areas is sharply fragmented by artificial influences. Numerous drains and canals create a

network structure in saline and brackish areas. A collector-drainage network and irrigation canals, laid parallel to each other, are distributed in the agricultural fields, which resemble geometric figures with different configurations.

The main scientific result of the study. Modern anthropogenic complexes formed in the semi-desert landscapes of Karabakh and Mil plains during historical periods are natural-anthropogenic territorial units controlled and regulated by people, whose structural-functional characteristics and productivity are constantly kept under control. Systematic study of the Karabakh and Mil plains and preparation of recommendations to increase their productivity are of great importance in the socio-economic development of our country.

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