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Regionalization of Nature Conservation in The Fergana Valley

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Abstract: The use of natural resources, mitigation of natural and anthropogenic processes, and environmental protection are inherently interrelated components of a unified and integrated system. These processes are most effectively implemented within specific landscapes or groups of landscapes. The nature conservation aspect of this system holds particular significance. This article examines such processes using the example of the Fergana Valley.

Keywords: Landscape complexes of the Fergana Valley, sustainable use of natural resources, environmental protection, regionalization, landscape, landscape resources, erosion and landslides, deflation, Chatkal-Kurama mountainous area, Northern and Southern Fergana foothills, Syrdarya riverbank, Central Fergana plain nature conservation regions.

Introduction:

In geoecological research, the classification, stratification, and naming of regions have consistently remained pressing and significant issues. One example of this is the process of natural geographical regionalization. Through regionalization, it becomes possible to assess the condition of specific natural geographic complexes, develop and recommend relevant practical measures, monitor their optimization potential, and forecast their future prospects.

[H. Vakhobov, U. Yakubov. Fundamentals of Recreational Geography. Textbook. – Tashkent, 2008. – p. 73.]

The diversity and distinct natural conditions of the landscape complexes of the Fergana Valley have long attracted the attention of many geographic researchers. Since the early 20th century, natural scientists have been engaged in the task of natural geographical regionalization of Central Asia, particularly the Fergana depression. Notable contributions in this field were made by L.S. Berg (1913), R.I. Abolin (1929), E.P. Korovin and A.N. Rozanov (1938), V.M. Chetirkin (1947, 1960), E.M. Murzaev (1953, 1958), and P.S. Makeev (1956), L.N. Babushkin and N.A. Kogay (1961, 1963, 1964), V.M. Chupakhin (1964), A.A. Abdulqosimov (1962, 1963, 1983), Yu. Sultanov (1965), R.I. Kholiqov (1988), A.G. Isachenko (1991).The scientific studies of these and other researchers are noteworthy. In order to ensure nature conservation and the rational use of resources, it is advisable to divide the territory into specific segments based on landscape contours, and to develop integrated economic activities in each zone according to uniform principles of natural resource utilization. This approach has been examined using the Fergana Valley as a case study.Like all regions of our Republic, the Fergana Valley has been divided into six natural geographical regions, taking into account the diversity of its natural geographic conditions. These include:Western Alay, Central Plain, Gavasay, Chatkal, Fergana, and Eastern Alay regions.

For nature protection and rational use of resources, it is advisable to divide the territory into separate parts based on landscape contours and develop a complex economy in them based on the principle of using the same type of nature. The use of natural resources, the fight against natural and anthropogenic processes, and the protection of the environment are in fact a complex, interconnected and unified process going in one direction. Therefore, it is important that this process takes place in the landscape or in the

territories of their specific groups. The environmental part of this system is of particular importance and requires special research. Nature protection has a multidisciplinary, broad and deep aspect, depending on the structural dynamic features of landscapes, the process of using nature and the activity of natural phenomena (Akramov, Zolotorev, 1975; Kadyrov and others, 1999).From this point of view, it is desirable that this practical task be developed on the territory of a landscape contour or a group of them, a nature protection zone. Zoning should be based on the map of natural geographical zoning and landscapes. L. N. Bebushkin and N. A. kogay (1964) divided two natural-geographical areas (Govasoy and Chatkal) on the territory of Фераһаregion [1; 8-b.].Using these areas, we divided the conservation areas into 5 in a scientific article prepared as part of the study:

- Chatkal-Kurama Mountains;
- Northern Fergana Foothills;
- Southern Fergana Foothills;
- Banks Of The Syrdarya River;
- CentralFerganaPlains

These territories differ significantly in their landscape structure, dynamic status, nature use, and nature protection complex.We will focus on the issues of nature protection in the process of nature management the following nature protection zones[3; p.22].

We will further examine the issues of environmental protection in the process of natural resource use within the designated nature conservation regions.

Chatkalo-Kurama nature conservation area is located in the northwestern part of the region, occupying the mountain ranges of the same name. Mountain landscapes are used in the field of grazing, forestry, hunting, partial farming, forage production, beekeeping, recreation, harvesting of medicinal herbs and other areas. Due to the relatively high amount of precipitation on the mountain slopes, they also perform the function of collecting moisture. Consequently, a large amount of moisture is obtained through the river (Ahangaran) and small rivers (Chodaksai, Sarvaksai, Gavasai, Rezaksai) for irrigation; water resources in reservoirs (Kengkulsai, Gavasai) are collected for agricultural irrigation systems.In the mountainous region, pastures, hayfields, water, hunting for wild animals, collecting medicinal plants, trees and shrubs are widely and frequently used. Because of such use, the receipt of the product rationally and according to need, or in other words, the order of rational use is violated.Ontheotherhand, qualityviolations, wastefulnessareoccurred. In this regard, due to gross errors in the use of pastures, their local productivity decreases. Pasture degradation occurs over large areas.

Due to the development of erosion and landslides, the area of pastures decreases, and the depth of bumpy terrain increases. This condition prevails on moderately elevated mountain slopes. Due to the continuous collection of medicinal herbs on the slopes, sections of surface erosion areas are formed.This is especially common near places of population. The results of deepening and erosion of ravines can be found in many areas where woody and shrubby vegetation is cut down, as well as in areas where pastures are used more intensively.

From the foregoing, it is clear that degradation in mountainous regions, in particular, land degradation, occurs as a result of deforestation, soil erosion and landslides, improper use of pastures and hayfields, and tree felling.As a result of the "tourist" activities of short-term and multi-day travelers (Akhangaron plateau, Kengkulsay, the upper Kuidaksay), various incidents occur in small areas. In particular, because of bonfire fires, forest fires, destruction of shrubs and trees occur, and indiscriminate hunting of wild animals takes place.

In mountainous areas it is necessary to protect nature, first of all, to use pastures correctly, completely abandon the practice of chaotic haying, do not pasture cattle in one place for a long time, change pastures in certain areas depending on ripening.It is necessary to stop the felling of trees and shrubs, to carry out the procedure of felling dry trees. Trees and shrubs regulate the water regime, prevent the formation of erosion and landslides, and significantly reduce the occurrence of floods.For this purpose, it is of practical importance that both sides of the main road leading to the Kamchik pass were fenced off with protective forest stands.The southwestern slopes of the Sattortov mountains, as well as the area around the villages of Chorkesar, Madaniyat, Parda Tursun, should be surrounded by protective forest stands.Also, the mountain slope of the route leading to the pass should be developed by forest melioration on the basis of a special program and project, and engineering structures should be built against erosion and avalanches [3; p.30].

The conservation area of Northern Fergana adyrs occupy the hilly area of the region. In hilly areas, the gap between the adyrs and the plains beyond the adyrs, where nature changed the most, is actively used in irrigated agriculture. Now adyrs themselves are developed in convenient places and used for agricultural purposes.The western part of the region

consists of pastures undeveloped due to lack of water. There are many settlements in the adyr region, which are also considered residential complexes and are an integral part of the region.According to the relief features of the region, in conditions of irrigated agriculture, taking into account meteorological factors, one can feel the widespread development of floods, hail, and erosion in the area. In other words, the Adyr region is a place of formation and development of the erosion process.According to A. Kazakov and others (2001), 36.7 percent of the slope of the region corresponds to plains with 0-1 degrees, this region does not need anti-erosion measures, and the area with a slope of 1-3 degrees is 10.7 percent. Площадьсуклоном 3-5 и 5-7 градусовсоставляет 19 процентов.Theselandscorrespondtoirrigatedarablelands[3; -s 32.].Anti-erosion measures are required: the slope of the remaining land exceeds 7 degrees and is typical of hills and mountains. In this case, first of all, it is necessary to conduct regular irrigation practices using anti-erosion measures.G. M. Makhsudov (1989) proposes the following to prevent soil erosion: 1) reduce the transverse slope of the slopes; 2) increase soil resistance to erosion and the fertility of washed soils; 3) the choice of soil protection methods and the use of irrigation equipment.

Deepening, erosion of ravines are typical for this region. A small ravine, which begins as a result of water discharge, is completely formed during the flood process, becomes complex and enters the phase of degradation. Ravines are more common in the valleys of Podshota, Chartaksay, Kasansay. Dry streams and ravines of various sizes in the west were formed as a result of the activities of temporary streams (the area between Chodaksai and Uygursai), starting from the slopes of the Kurama mountain range. Because of erosion of undeveloped adyrs, bumpiness and depth, as well as density on an area of 1 ha, are very large, which is completely unsuitable for agriculture. Given the current situation, it is important to apply a set of measures against erosion, erosion of ravines, mudflows and floods in the area. Artificial recesses are available to discharge mudflows, but more special water collection facilities will be required.In connection with the development of adyrs, the level of groundwater in the lands behind adyrs increases, in some places soil salinization occurs, therefore, it is necessary to optimally use water during irrigation. During watering on adyrs, a lot of water is absorbed into the soil, and in other places, especially behind adyrs, water accumulates and affects the salinization of the soil. Currently, the process of soil salinization is developing and is entering the stage of formation. Therefore, it is necessary to identify regional causes on the ground and take special measures.In this conservation area, in the valleys of large and small rivers, there are settlements and cities (Yangikurgan, Kasansay, Chust, Olmos, Gova, Varzik, Iskovat, etc.). In the irrigated part of this region, they, in this respect, in appearance and form, merge with the surrounding oasis. In the west, in the desert, settlements form oases of different sizes and shapes, and this feature is radically different from the surrounding steppe. Due to pastoralism, residential landscapes are small and scattered, and the development of erosion processes requires the study of this territory within this region.

In the Southern Fergana Foothills Nature Conservation Region, the following foothill zones stretch from west to east: Rapkon, Sarisuv, Sokh-Rishton, Chimgan, Khonqiz, Avval-Arsiv, Kuva, Andijan, Asaka, Polvontos, Southern Olamushuk, and Khonobod. These areas constitute the primary land fund of the Fergana and Andijan regions.In the Sokh-Rishton foothills, lands that can be irrigated using canals diverted from the Sokh River have been more intensively developed. These areas are home to orchards and are used for the cultivation of cereal grains, melons, and other agricultural crops. Additionally, orchards, forested areas, and recreational zones are widely found in the Polvontos and Andijan foothill groups.

To facilitate land development and utilization, various land leveling activities are carried out, including deep soil excavation, vertical ploughing, the construction of ridge beds, and irrigation. However, practices such as cultivating water-intensive crops, over-irrigation, and failure to prevent soil erosion have led to increased risks of soil degradation and the disruption of irrigation systems. эThe absence of anti-erosion measures, inadequate management of water discharge, and the uncontrolled diversion of runoff into dry channels, ravines, and gullies between water distribution points have led to concerning developments. As a result, the geoecological and meliorative condition of more than 150,000 hectares of land in the Southern Fergana foothills has deteriorated.These negative processes have caused widespread soil erosion and thinning of the soil cover across the entire study area, although the degree of degradation varies by location. In some places, the topsoil has been completely washed away, exposing the underlying strata of gypsum and gravel deposits. Erosion has also led to the formation and expansion of gullies, landslides, and surface collapse zones.The foothill region represents one of the most sensitive zones of the valley, where any intervention has a cascading effect not only on the foothills themselves

but also on downstream areas. Therefore, land development and utilization in the foothills must be approached with extreme caution.To maintain or improve the overall eco-meliorative condition of the Southern Fergana foothill systems, the following measures are essential: strict control over irrigation regimes, water supply through anti-filtration lined canals, prevention of unregulated water discharges, differentiated water distribution for each foothill or group of foothills, based on: lithological composition of the land, topsoil thickness, depth and concentration of gypsum layers and slope gradients. Additionally, gypsum-exposed surfaces should not be irrigated. Ridge beds must be formed along horizontal contour lines with minimal slope, and terracing and sodding of slopes should be carried out to prevent gully expansion and stabilize the terrain with vegetation.

The coastal conservation area on the Syrdarya banks occupies the current river valley. The valley is engaged in irrigated agriculture, animal husbandry, hunting and other industries, oil and construction materials are extracted. As a result of the economic activity of the population, the processes of erosion, deflation, suffusion, landslides, and waterlogging developed on a regional scale. Heavyrainsoftencausefloodingandhailinthespring.Regular disappearing and erosion of the riverbank is a natural phenomenon that allows us to study the Syrdarya valley as a conservation area. The proper use of water and land in the valley can solve many problems. Since the groundwater level lies on the surface, hydromorphic irrigation when applying the reclamation regime and establishing water standards for irrigation of crops requires special care.Excessive irrigation with water in this mode further enhances the hydromorphic properties of the soil. Even if saline does not accumulate, the physicochemical quality of the soil is deteriorated. Erosion along the banks of the Syrdarya is strong. Starting from the Namangan meridian, the riverbed takes a curved shape, which enhances the process of washing out the banks on steep lines, accelerating landslides and erosion on steep slopes. Thisprocessintensifiedbecauseofthedestructionoftugaithickets.The main goal is the restoration of ancient shrub groves 1000-2000 m wide. The main object of erosion is the confluence of terraces I and II, the most acute of which is the steep slope from terrace II to terrace III. Water discharges formed ravines of various sizes during leaching on sharply defined slopes. Covering such areas with trees 25-50 m wide prevents erosion, and leaching stops.

In the valley, there are large settlements, towns, regional centers, villages. They occupy cone-shaped branches of large and small rivers, for example, Namangan, Uchkurgan, Chartak, Turakurgan, Pap, etc. In connection with the conical distribution of rivers and streams flowing from the north of the Syrdarya and crossing the III terrace, their reclamation state is somewhat better. The shape of the intersection is well defined. The reclamation state of the conical floods of the rivers formed on the II terrace of the valley is also not bad.They do not observe a natural pattern during the conical spill in Kokand, so salinization of the soil does not occur. The regular use of a set of measures against erosion and deflation, floods and other dynamic processes in the environmental zone leads to their optimization. Consequently, the preservation of the natural environment and increased crop yields were achieved.

Central Fergana Plain Nature Conservation Region

The Central Fergana Plain Nature Conservation Region occupies part of the territories of Fergana, Andijan, and Namangan provinces. It is situated on the vast third terrace of the Syrdarya River and represents an alluvial-proluvial plain. The region's relief is diverse, featuring sandy areas, saline lands, and low-lying undulating terrain. The dominant landform is a sandy plain, characterized by dunes and barchans. For example, the area on the left side of the Kokand–Tashkent highway consists of extensive sand masses covered by scattered shrub-like vegetation formations [4; pp. 28–45].The Central Fergana Plain is primarily composed of fluvial deposits, although in some places swampy, saline, and sandy soils, as well as dune hills and fluvial depressions, are observed—formed as a result of both river processes and wind action. The groundwater table lies close to the surface and is highly mineralized, contributing to the salinization and waterlogging of the soils in the region.

At present, a large portion of the Central Fergana lands has been developed and transformed into cultural landscapes, and is primarily used for pasture-based livestock farming and partially irrigated agriculture. In the Fergana Valley, flat plains are often covered by sandy soils, which contribute to the formation of extensive saline fields.

Saline and salinized soils are predominantly distributed along the margins of the alluvial fans of the Sokh, Isfayram, Altyaryk, and Margilan-Isfayramsay rivers, as well as in the interfan depressions. In addition, these soils occupy large areas of ancient alluvial plains.The main source of salt in all saline and salinized soils is mineralized

groundwater, which is characterized by its proximity to the land surface.

Meadow soil oases, where barchan sands and halophytic saline soils coexist, are found on the upper terrace, specifically the second terrace of the Syrdarya River, as well as in the newly cultivated lands along the Sokh, Isfara, Isfayram, and Shohimardon floodplains. Each sand massif in Central Fergana has a unique origin and developmental history. Major sand massifs in the region include Khojaduvanaqum, Bulbultepa, Bostanbobo, and Sarsonqum. The sands in Damkul, Sarisuv, Achchiqqol, and Sarsonqum originated as a result of the deflation of ancient alluvial deposits of the Syrdarya. In Central Fergana, due to low precipitation, long hot seasons, and the shallow depth of mineralized groundwater, the decomposition and breakdown of materials occur under conditions of intense biological activity, which leads to minimal accumulation of organic matter. As a result, the humus content in meadow soils is notably low.The region is located between drainage collectors such as Shimoliy Bagdad, Achchiqqol-Rishton-Bagdad, Qoraqalpoq, and Oqoltin, which has necessitated the installation of numerous zovur (drainage) networks.Among natural processes, deflation is predominant in this region. The sandy relief forms were established earlier and are now increasingly being stabilized through reclamation efforts involving psammophyte species. At present, the main conservation priority in this area is to reinforce sand stability and to ensure that desert land reclamation is carried out in an orderly and planned manner.Additionally, preventing the degradation of sandy areas by grazing livestock is a critical issue. Expanding reclamation through psammophyte-based afforestation is highly significant. When these plants are placed according to a well-developed land use plan, the results are much more effective.Moreover, the growth of ephemeral and ephemeroid plants beneath shrubs such as white saxaul, cherkez, and kandym helps enhance dune stability.

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