

ENVIRONMENTAL SUSTAINABILITY OF GEOSYSTEMS IN UZBEKISTAN: EVALUATION, FORECAST, MANAGEMENT AND ISSUES OF RECREATIONAL NATURAL RESOURCE MANAGEMENT

***Rafikova Nodirakhon Azamovna**

Institute of Seismology at the Academy of Sciences of the Republic of Uzbekistan

**Author for Correspondence*

ABSTRACT

Natural conditions and resources of Uzbekistan are extremely diverse, unique and specific in some places. Their conditions seriously aggravate economic use of the resources. This is primarily due to mosaic pattern of environmental sustainability of Geosystems. In this regard, evaluation, forecast and management of sustainability of dominant Geosystems in the country has certain practical importance. An analysis of possible exploitation of resources of the Geosystems with a variegated environmental sustainability is done here with respect to the recreation vis a vis natural resource management.

Keywords: *Geosystem, Ecological Balance, Natural Resource Management, Geographical Forecast, Recreation*

INTRODUCTION

Due to intensive and unorganized use of natural resources in Uzbekistan, ecological balance is more and more disturbed. This has disturbed the normal state of environment, and its social and economic consequences are well known for us. It suffice to say in this regard about ecological catastrophe of the Aral Sea and the Aral Sea Region, which resulted from mismanagement of water resources in the region, due to which economic condition of the Aral Sea Region has been steadily deteriorating for more than 50 years (Alibekov and Alibekova 2001). All this is directly related, on the one hand, to fragility of a desert Geosystem, and, on the other hand, to the nature of the natural resources management. Therefore, study of the environmental sustainability of Geosystems in the Republic under conditions of intensification of impact of the technogenic factor is of great importance.

Evaluation of Environmental Sustainability of Geosystems

Geosystems (landscapes) of Uzbekistan in regional and typological respect are located in mountain areas, at foothills and flat areas.

The following can be said about mountain Geosystems occupying the areas of erosion and substances run off with respect to their stability:

The main natural properties that determine mechanism of stability are self-cleaning and self-healing ability of waters, soil, subsoil, vegetation and ecosystems. The greater steepness (12-15° and more) of slopes contributes to degree of purity, loss of microbes. Light mechanical composition of soils, presence of a large amount of humus (2-5%), thickness of soils and subsoil is based on the ability to self-clean the oil products, pesticides, heavy metals, etc. during the year.

On mountain slopes, especially at the northern exposure, density of vegetation cover is the largest (10-15 pieces of trees per 10 square meters, 6-10 units of shrubs and dense grassy cover), therefore stability of Geosystems is high, as erosion, landslide, gravity processes are manageable in these areas. Dense vegetation cover protects the slopes from eradication of various natural resources. Environmental sustainability of Geosystems on these slopes is ensured, but the issue is rational use of local resources, i.e. maintenance and constant preservation of ecological balance.

The foothill areas (zones of proluvial trains, cone deltas) are characterized by accumulation of parts of substances run off from slopes, and the rest is carried away by delta zones of rivers. In the foothill zone, the environmental sustainability of Geosystems is sharply differentiated by parts of the cone deltas and proluvial trains. In particular, it is the most stable in their head part due to ensured underground outflow

General Article

of groundwater, it is less stable in the middle part due to poor presence of horizontal outflow of groundwater, and it is sharply unstable in the lower peripheral part due to practically drainless territory (Alibekov and Alibekova 2001).

The plain (desert) areas of the Republic are distinguished by formation of deltaic, sandy Geosystems, as well as Geosystems of plateau and residual mountain heights. Delta Geosystems as well as cone deltas are differentiated at the head, middle and peripheral parts; and due to the same known reason, the delta Geosystems of Amu Darya (Khorezm Oasis in Pri-Sarykamysh Delta, Karakalpak Oasis in the Aral and Akchadarya deltas), Zarafshan (Bukhara and Karakul Oases in Bukhara and Karakul Delta, respectively), Kashkadarya (Karshi Oasis in the Delta of Kashkadarya), Sherabaddarya (Sherabad Oasis in the Sherabaddarya Delta) and others are characterized by a variegated environmental sustainability. Due to this there is prevalence of peripheral part of deltas and general flooding of the oases due to their practically drainless territories. Therefore, at the present time almost all oases of Uzbekistan are strongly flooded, which has a significant impact on crop yields, land reclamation conditions and sanitary and hygienic conditions of settlements, quality of groundwater, etc. (Rafikov, 2001).

The Kyzylkum Geosystems are structurally and dynamically unstable in general; here, elimination of a rarefied cover at rapid rates has led to the formation and establishment of deflation sites, formation of barchans, securing of which is very difficult and requires a large amount of labor and experience. Therefore, in order to restore previous productivity of pastures longer duration is required that lasts at least 5-7 years, sometimes even longer. Ustyurt is also not stable with regard to stability of Geosystems, restoration of ecosystems of degraded areas does not occur usually, deflation (so-called "bald" lands), karst formation, suffusion, in the absence of conditions for vegetation (wormwood, biyurgun, tasbiurgun) are developed (Rafikov (2001).

A brief analysis of the environmental sustainability of Geosystems in Uzbekistan indicates that almost all Geosystems are unstable in the region, except for the mountain zones, i.e. natural complexes are not capable for self-regulation and self-recovery, requiring a special approach for use of their resources and, in general, for nature management.

Forecast of Environmental Sustainability of Geosystems

In order to foresee the future state of environmental situation in the Geosystems preparation must be done to prevent expected negative processes in advance, and it is also advisable to develop a forecast of changes in the environmental sustainability of Geosystems of the Republic for the next 5-10 years. It has a significant practical importance under conditions of intensive use of natural resources, since we shall be aware of the consequences of the current nature management in advance.

Some changes may be expected in environmentally sustainable mountain Geosystems in the nearest 5-10 years with a trend of erosion of slopes, especially at the southern exposition as a result of development of linear erosion, soil landslides, where sparsity of vegetation cover is high (1-3 trees and upto 5 shrubs in an area of 100 m² and with 30-50% projective covering of grasses). At this time, development of negative processes is not expected at the northern exposure due to presence of a dense vegetation cover.

In the oases with conditions of current salt balance, especially in the delta and terrain Geosystems, it is expected that saline lands will increase by 10-30%, and it is also necessary to take into account transition of highly saline soils to the category of medium saline, and the latter to highly saline soils, and it appears that the range of salt marshes will be expanded. Expansion of areas of saline soils is a result of sharp dominance of hydromorphic irrigation regime in oases (Rafikov, 2015).

In the lower reaches of the Amu Darya River, especially in Karakalpakstan, where the positive salt balance clearly prevails, deterioration of land-reclamation state of irrigated lands will become even worse, since horizontal outflow of groundwater is almost absent, and a vertical runoff of moisture conducive to salt accumulation in the aeration zone is sharply prevailing. Therefore, under the current conditions of neglected drainage and other effective measures in the region, an increase in soil areas with salinity of medium- and heavily saline soils with salt pans is expected.

General Article

In the northern part of the Amudarya Delta, where anthropogenic desertification is intensified due to decrease in the level of the Aral Sea, further aggravation in development of this process is expected. Especially in this respect, degradation of riparian woodland will be accelerated, and it is possibly that the riparian woodland ecosystems along the channels of the delta will dry up under conditions of a deficit of the Amudarya water. The ranges of Black Saxaurs, “Yulgunnik”, “Karabarachnik” and annual “Solyanka” will expand due to the reduction of the areas of grassy riparian woodland and wild grasses. This will result in decrease in pasture productivity by 20-60% or more. As a result of intensification of deflation, it will be obvious that activation of formation of mobile sands in the places of the riverine embankments, which are mainly composed of river sand, will occur.

Developing Geosystems of the dried up part of the Aral Sea bottom (at the beginning of 2016 this area was more than 5.7 million hectares) are extremely unstable, i.e. highly dynamic. The designed forecast versions show that they acquire eluvial features that are specific for the surrounding deserts, formation of a zonal soil-vegetation cover will occur, and the emerging mobile sands will be fixed by psammophytes and xerophytes. It is established that, in this case, pasture exploitation can lead to development of undesirable processes in a large scale, therefore, in future, it is necessary to refrain from even local use of them. In the Karshi Steppe, where oil and natural gas drilling is performed on a large scale under conditions of insufficient environmental sustainability of Geosystems, further degradation of soils and vegetation in the first place shall be expected.

Elimination of vegetation and soils

Elimination of vegetation will cause formation and establishment of mobile sands in the drilling areas, and in the oil and gas production area, where eolian relief forms have already appeared in local sites. Technogenic load on the ecosystem is several (3-5) times higher than permissible load (Rafikov, 2015).

As a result of forecast studies it was found that due to insufficient environmental sustainability of Uzbekistan's Geosystems, especially in its flat areas, it is possible that development of negative anthropogenic phenomena related to extraction of minerals, lack of radical measures to control large areas with salt accumulation in oases and degradation of desert pastures shall be expected in the nearest 5-10 years.

Problems of Recreational Nature Management

Natural conditions and wealth represent one of blocks of a recreational resource. A person likes to rest and enjoy spending time with nature and outdoors. Recreational activities require favorable natural locations (Geosystems), where a person may be able to relax (it can be mountain valleys with unique landscape and a water pool, mild climate, lakes or rivers with constant water level in summer, forests or gardens with a water pool etc.). Tourists are more interested in mountain valleys, steep slopes, passes, snowfields and highland glaciers, rugged rivers and small rivers (sais), nature monuments (caves, waterfalls), etc.

Currently, the recreants almost do not go outside the country, and plan to enjoy the time at good resorts in sanatoria, boarding houses, at beautiful places in nature (although there is no appropriate infrastructure in such places at all) of the Republic (Kurbanov *et al.*, 2016). Number of uncontrolled tourist groups and townspeople having a short-term rest in mountainous areas is increasing. In this situation, the natural environment of the country's recreational areas begins to degrade; ecological balance is broken, water basins are polluted, new paths appear, and vegetation on the paths is destroyed, number of local fires increases, nature is polluted by garbage left by the tourists.

It is feasible to develop the following for rational use of natural environment and its wealth, and the recreational zone of the country: first, general provisions to use natural resources by recreators, second, to legitimize the use of environment, they must pay a certain "green" tax for staying in the recreational zone, to impose penal fines in quite large amounts for violations of rules for resources' use, especially for pollution, fires, gathering medicinal herbs and plants listed in the Red Data Book, animal hunting and damaging or destruction of other geo-ecological items; third, to promote activities for promotion of eco-tourism culture in the recreation zone; fourth, to issue special recreational cards with appropriate

General Article

circulation showing places for rest, bathing, natural monuments, forests, hiking routes for tourists, slopes, springs, unique mountain scenery locations, rental points for boats, catamarans, tents, sports grounds, public catering facilities, recreation facilities, libraries, shops, hotels, camp-sites, etc.

Uzbekistan is a rich country with regard to favorable natural conditions and resources for recreation, there are complexes of sanatoriums and recreation areas (Chartak, Chimyon, Botanica, etc.) of world significance. Nevertheless, the existing recreational potential of the Republic is not able to accommodate a large number of holiday makers. There are great opportunities for creation of new recreation centers and treatment of population, not only from our country, but also for foreign tourists, all year round on the territory of Kashkadarya, Surkhandarya, Tashkent, Samarkand, Namangan, Fergana and in other regions.

Conclusion

In Uzbekistan, studies of environmental sustainability of Geosystems identified: 1) in general, mountain and foothill Geosystems are relatively stable to technogenic impacts in comparison with the flat (desert) zone; 2) it is established that evaluation, forecast and management of Geosystems of unstable regions are logically interrelated and interdependent; 3) management and promotion of recreational activities at natural sites if improved could lead to environmental sustainability of the territory vis a vis its economic growth.

REFERENCES

- Alibekov L and Alibekova S (2001).** Desertification Process in Central Asia and its Socio-Economic Consequences. Problems of Sustainable Development of the Region. Sustainable Economic Development and Management of Regional Resources: *Proceedings of the International Conference*. - Tashkent-Nottingham: TEUH. Nottingham Trent University, 18-21.
- Kurbanov BT, Kovalevskaya Yu I, Tolkacheva GA (2016).** The Question of Ecological and Geographical Zoning of the Territory of the Republic of Uzbekistan According to a Level of Atmospheric Air Pollution: *SANIGMI Works. Issue 1 (246)*. Tashkent: Uzgidromet, 138-149.
- Rafikov AA (2001).** Geoecological Problems of Piedmont and Mountain Valleys of Uzbekistan and the Lines of Approach. Geoecology and Geoecological Issues of Mountain and Intermountain Systems': *Materials of an International Conference*. - Tashkent: University, 23-24.
- Rafikov VA (2015).** Theoretical and Scientific Foundations for Study of an Issue of Nature and Society Interfacing and its Consequences for Purposes of Environmental Safety. *Proceedings of the Geographical Society of Uzbekistan*. - Tashkent, 35 19-22.