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EXPERIENCE ASSESSMENT OF THE ECOTOURISM POTENTIAL OF NAMANGAN REGION IN TERMS OF ECOSYSTEMS

Abstract: *The radical reforms in the tourism industry in Uzbekistan led to the development of ecotourism in all regions of the country. The article discusses the development of ecotourism in Fergana Valley, the relatively undeveloped area of Uzbekistan. A special resolution of the governor of the Namangan region posed a task for researchers to assess its ecotourism opportunities. For the first time in Uzbekistan, a mereological approach of investigating the ecotourism potential of the region's ecosystems was chosen. The article gives theoretical aspects of ecosystem classification for determining the optimal possibility of using the natural potential of the region. Based on the ecosystem categorization, the optimal taxonomic units for medium scale mapping of the region have been determined. 13 ecosystems have been distinguished which form 4 separate ecotourism areas. These areas were used as mono and complex ecotours routes, considering the practical aspects of the protection, rational use and restoration of ecosystems.*

Key words: *tourism, ecotourism, regional development, ecosystem, new approach, materials and methods, mereological approach, classification, implementation, ecotourism areas, evaluation, Oikos, characteristics, second type reconfirmation.*

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Introduction

Ecology is a discipline of science, which studies interactions among organisms and their environment in particular ecosystems, as we know it. In this definition, ecosystems present as the object of ecology. Actually, ecology is, according to its derivation from the Greek “Oikos”, meaning “household, place to live” and “logos” – “study”, the study of the environment of organisms. Thus, the conduction of any ecological researches in terms of ecosystems comes from the requirements of philosophy to disciplines [1, 4, 5, 6, 7, 8, 10].

The issue of development of all types of tourism in 2017-2018 according to the local conditions and opportunities has been raised after the Presidential Decree of the Republic of Uzbekistan dated December 2, 2016 # UP-4861 “On measures on ensuring rapid development of tourism industry in Uzbekistan”. On March 1, 2017, the State program “On the implementation of Strategy of Actions on Five Priority Areas of the Development of the Republic of Uzbekistan for 2017-2021 in the Year of Dialogue with the People and Human Interests” has been approved by the governor of the Namangan region. Article 27 of the program states about “the creation of new tourist destinations in the regions, development of modern types of tourism and development of measures on strengthening their attractiveness”.

According to this, with the response of first deputy governor of the region, it is planned to develop a related plan of measures, diversify tourism services

and create new tourist destinations, assess tourism potential of the areas and create new tourism products, implement a complex of measures on organizing tours and excursions for local people.

Materials and methods

In researches related to ecosystems, two approaches are used: holistic, that is the whole and mereological, the detailed study of component parts. The holistic approach is complex research of all components of matter and energy flow in ecosystems in terms of quantity and quality. The mereological approach divides the ecosystems into initial and secondary components and studies all factors and processes that influence the main components. The results serve to analyze and generalize the shaped ideas related to the whole ecosystem. We also used the mereological approach to define the ecosystems of the region. Because in ecosystems living organisms and non-living substances directly connected with each other, that means not only non-living natural factors influence organisms, their morphological and morphometric parameters, but organisms also influence them. During the research, using the cameral analysis, semi-stationary and expeditionary methods there has been developed the map of ecosystems of the Namangan region and its ecotourism potential has been assessed.

The received results of research and discussion.

The ecological system (ecosystem) is a definite biotic structure formed through energetic flow in a particular natural environment, an interaction between organic and non-organic world. According to E.Odum, the population of organisms should be investigated together with the non-living environment and they unitedly form ecosystems [3, 8].

N.F.Reymers defines it as “the environment and community of any organism that forms a functional unit, appears due to interaction between particular ecological components and results of this interaction [8, 9].

After the development of Ecological systems theory, Bertenfall (1960), Margalef (1968), Watt (1968), Petten (1966, 1971), Van Dane (1966) showed the necessity of assessment of ecosystems in any ecological researches in terms of quantity [5, 6, 7]. Because ecosystems require to assess and separate them from the point of possibilities of management of interaction between components, keeping, choosing and restoring the environment. To conclude, scientists proved that the systematic approach in ecological researches is very useful.

It is difficult to agree with some ideas of A.Rafikov related to territorial and width specifications. Because, firstly, both ecosystems and geosystems have hierarchical levels. This was proved by G.Odum, the brother of E.Odum (1967,1971) so that outer interactions between the ecosystems coincide with the systematic approach. Actually, ecosystems are divided into components and rank them according to a hierarchical level. Ecosystems consist of not only geosystems of the earth but also an air of the atmosphere, lithological width, water are and soil horizon [3].

Geosystems are classified from geographical crust to down when ecosystems are divided from the ecosphere to down. If the smallest taxonomic unit of geosystems is facies, the smallest unit of ecosystems may consist of one drop of water. It would be correct to evaluate ecosystems from the point of their environment and, not the food chain. Thus, classification units of ecosystems may include particular geosystems as geoecology is a part of the ecology.

Geoecology mainly studies geosystems of the earth, another branch of ecology Hydro ecology studies water ecosystems, atmosphere ecology – ecosystems in air space, soil ecology investigates ecosystems in the soil horizon. Deforestation has led to the formation of the climate, soil, water, and organisms specific for steppes. The variety of organisms, their quantity is directly proportional to the content of the non-living environment [2].

Therefore, protection of the organic world of natural ecosystems, their effective use, protection, and restoring of biological diversity are issues of significant importance. Ecosystem classification means recognition and differentiation of interactions between organisms and their relations to the environment according to morphogenetic parameters. However, there is no generally recognized scheme or table of ecosystems, which are the object of ecology. Based on the idea of D.L.Armand (1975) related to the geographical classification, we categorized ecosystems of Namangan region according to the rules below:

- Meet the requirements of philosophy for the methodology of science;
- Focus on a specific objective;
- Be scientifically and practically important;
- Non-repeat of categorized groups;
- Simple and fluent expression of group names;
- Opportunity to investigate it methodologically etc.

N.F.Reymers categorize ecosystems as micro, mezzo and macro ecosystems according to their units of measure. We think it is true to single out mini-ecosystems too. Such classification serves to explain the geographical specifications of ecosystems. Indeed, the types and varieties of ecosystems are classified according to the sizes of organisms [8, 9]

During the classification of ecosystems of Namangan region, the following works were used:

- On general issues – Ferganskaya Dolina (1954), Ferganskaya Dolina. Kartographicheskiye materially (1954), Baratov P. (1996),

- Geomorphology – Mamatkulov M., Nigmatov A., (2006), A.N.Nigmatov, A.Dadakhuzhaev (1997),
- Hydrology – Ilin I.A (1959), Rasulov A.R., Hikmatov, Aytboev DP (2003), Soliev EA, Umarov H. (2006), Baratov A.S. (2007), Soliev E.A. (2008).
- Soil horizon – Shuvalov S.A. (1957), Makhsudov A. (1989), Kazakov A. (1993),
- Flora – Nabiyev M.M. (1959), Arifkhanova M.M. (1967), Pratov U. (1970), Rakhimova T. (1972, 1973), Vernin R.S., Rakhimova T. (1982),
- Fauna – Zakhidov T. (1962),
- Ecology - Usmanaliev A. (1977), Saliev B.K (2008), Nazarov A.A. (2004), Nazarov A., Mahkamov Sh., Mahkamov I. (2013), Xusanov T.X. (2014),
- Economic activity - Passport of Namangan region (2013), Kozokov A, Nazarov A., Abdurakhmanov S., Kamalov B. (2013).

I. *High mountain ecosystems.* The absolute height of the territory of high mountain ecosystems is 2400-4000 meters that cover the peaks and foothills of Arashon, Ortalik, and Karavultepa mountain ranges of Western Tien-Shan. This ecosystem is divided into two types:

First type: Ecosystems with nonvascular plants and relative fauna. Consists of plains, eluvial and diluvial deposits, foothills, and effusive and intrusive rocky mountain ranges of paleozoic era. The foothills are not formed completely in points of crossing; geomorphological forms like small pointed stones specific for mountain valleys are not rare. The temperature of the climate is low (20-22°C in summer and -3-15°C^0 in winter), the amount of rainfall 400-500 mm, the snow ratio is high (70-75%) which explains the year-round presence of snow on peaks of northern and north-western ranges and 7-8 months on the southern side. Rare spruce forests and hydrophilic earthen plants are popular in the area. In the formed ecosystem, there are mountain goats, panthers, Menzbier's marmots, mountain partridges, kites, eagles and buzzards. Minimal anthropogenic forcing is present due to natural conditions.

Second type: Ecosystems with rare spruce forests and hydrophilic earthen plants, mammals, and birds. Consists of the mountain range from Mesozoic and Cenozoic deformation and eluvial and diluvial deposits with dark brown soil and geomorphological forms like small temporary water flows specific for mountain valleys. The temperature of the climate is 22-28°C in summer and -1-12°C^0 in winter, the amount of rainfall 350-470 mm, and the snow percentage is 40-50 %. There are small creeks, (Arashon, Zikirkol, Kelimchek), in hills, small lakes (Arashonkol) and bogs like Betetepalik are found. In the Arash on mountain valley, there is naturally formed spring Arashonbulok that has therapeutic properties. Their variety of animals consists of Menzbier's marmots, ferrets, lynxes, mountain goats, marmots, wild boars, wolves, and foxes, there are different birds such as quails, owls, falcons, bustards. The flora of the system includes ziziphora, hypericum, mountain basil, mountain pepper, mentha, hawthorn, dogrose, rare spruce forests, and hydrophilic earthen plants. This ecosystem is extensively used by some representatives of the population for seasonal hunting, husbandry and mountain gardening.

II. *Middle mountain ecosystems.* Such ecosystems are located in the western and northern parts of Pap district, northern parts of Chust, Kosonsoy, Chortok, and Yangikurgon districts. They also can be separated into two types: flatlands of rare spruce forests, shrubs and feather grasses, and ecosystems of farmed middle mountain ecosystems.

Third type: Ecosystems with flatlands of rare spruce forests, shrubs and feather grasses. The height of such ecosystems reaches 1900-2400 meters in the north and 2000-2500 meters in the south. Consists of foothills from Paleogene and Neogene era and eluvial and diluvial deposits, in plains covered with pluvial deposits. Used as seasonal pasture. Together with rare spruce forests (Red and black spruces), wild fruits such as crataegus, mountain apple trees, mountain cherry trees, barren trees like mountain pines and mountain willows, and shrubs (wild raspberries, dogroses, and thistles) grow in the ecosystems. The flora also includes ziziphora, hypericum, mountain basil, mountain pepper, mentha, hawthorn, dogrose, rare spruce forests, and hydrophilic earthen plants. Jackals, wolves, foxes, and squirrels are main representatives of fauna together with such birds: owls, falcons and small eagles. This ecosystem is extensively used by the population for seasonal hunting, husbandry and mountain gardening.

Fourth type: farmed middle mountain ecosystems. They also consist of proluvial deposits of Mesozoic and Cenozoic deformation. The higher part of this ecosystem is used for rainfed agriculture, sierosem dark brown soil of middle and flatlands are used for gardening, the rest typical sierosem soil for other types of the peasantry. Unfarmed parts are abundant with mountain basil, mountain mentha, and hydrophilic earthen plants. The fauna consists of mammals – wolves, foxes, jackals, birds – owls, kites, black crows, sparrows, and linnets. Reptiles, such as tortoises, upland snakes, and lizards are habitants of the ecosystems.

Low mountain ecosystems: the two types of such ecosystems are classified differently than the ecosystems above, that is, they are categorized according to height zones. Their anthropogenic level is related to the geomorphological and climatic specifications of the area. Typical continental climate rules in these ecosystems, the average temperature of July +28-32 C^0, that of January -2-8 C^0. The average annual rainfall is 150-180 mm.

Fifth type: Unfarmed middle mountain ecosystems. Located in the southern and eastern part of Pap district, northern and north-southern parts of

Chust district, the western and northern part of Turakurgan, the southern and southeastern part of Kosonsoy, the northern part of Yangikurgon district. The geological structure consists of the Quaternary period's magmas and metamorphic substances. The foothills consist of diluvial deposits, flatlands – proluvial, the mountains – eol deposits. The soil type is typical and sierosem light. The water supply level is not high. Low mountains are deformed by hydrographic components such as Rezaksoy, Pungansoy, Kosonsoy, Podishokhotasoy. Water collectors Zarvaksoy, Rezaksoy, Chust, Eskiyer are located in this small ecosystem. Flora density proportionally raises from west to east. In the unfarmed mountains of the region, xerophytes such as lilac, garmala, camel-thorn, sorghum of Aleppo, cane are very widespread. In the western part, apart from them, holophytes and semi-shrubs are found. The fauna consists of porcupines, gophers, field mice, lizards, hedgehogs, tortoises, snakes, their enemies – owls, kites, falcons, and eagles. Steppe foxes and jackals are a few mammals. The ecosystems are characterized as the wide use of them as pasture for husbandry.

Sixth type: Farmed middle mountain ecosystems. Located in the southern part of Pap district, northern and western parts of Chust district, southwestern and southeastern parts of Kosonsoy, the northeastern part of Yangikurgon district. The Northern Fergana Kanal and Great Namangan kanal flow from northeast to southern west. Pungansoy, Rezaksoy, Kosonsoy, Podishokhotasoy streams cross these canals. Kokserak, Yertikan and Warzik water collectors play a big role in water supply if the area. The main feature of its geological structure is that it has a big spread of loess and relatively enough supply of water. The biggest territories of Pap and Chust districts are specialized in growing cotton, wheat, and cucurbits. Kasansay and Yangikurgan are specialized in gardening and its intensive ways, and growing vegetables.

IV. *Rolling hills ecosystems.* These types of ecosystems are divided into three regarding the level of participation of humans in them: Rolling hills ecosystems of permanent pastures, rainfed and irrigated agriculture. Because the Fergana valley, including Namangan, is the territory of a very high density of population. The people living in the territory are considered as the main type of organisms.

Seventh type: Rolling hills ecosystems of permanent pastures. With highly deformed relief, the main core consists of deposits of Quaternary period, the soil of such ecosystems is light sierosem, soil salinity and erosion are very high. People intensively use the area for husbandry; therefore, it is covered with rare sagebrush, saltwort, and ephemeral plants. The absolute height goes up that is the increase of annual rainfall level to 30-50 mm is the main cause of coverage of bigger areas with semi-shrubby plants.

Eighth type: Rolling hills ecosystems of rainfed agriculture. The level of these ecosystems in Yangikurgan, Chortok and Pap districts is 900-1000 meters above the sea level. Found on the typical dark sierosem soil laid on eluvial and proluvial deposits, eol loess, conglomerate, sandy and chalk stones. The climate is temperate continental, seasonal rainfall level is 180-200 mm. The average temperature of July +26-28 C0, that of January +2-6 C0. Pungonsoy, Zarvaksoy, and Jiydalisoy water collectors are located in the area. Due to natural conditions, xerophytes such as lilac and camel-thorn, holophytes like thick-grained sedge and sorrel, and in the plains moisture-loving xerophile plants are widespread. Rainfed agriculture logically is done in relatively high and flat rises, therefore mammals like porcupines, gophers, foxes, jackals, reptiles like tortoises, snakes, lizards, birds such as kites and owls live there.

Ninth type: Rolling hills ecosystems of irrigated agriculture. Such ecosystems located in the areas supplied with artificial irrigational networks, on the lands with typical light sierosem soil formed on loess in the eastern part of Turakurgan district, the southern part of Kasansay district and southeastern part of Yangikurgan district. The average temperature of July +28-30 C^0, that of January +0-5 C^0. The average annual rainfall is 140-180 mm.

The irrigated part is supplied with water from hydrographical networks Podshootasoy, Kosonsoy, Rezaksoy, Govasoy through pumps. Hills of Pap is specialized in growing grapes and medical herbs, of Chust to grow cucurbits and grapes, hills of Turakurgan and Kosonsoy on growing grapes, cotton and wheat, the hills of Yangikurgan and Chortok are mainly specialized on gardens (apricots, cherry, plum, nuts, etc.). During the latest years, the big investments are being made in the sectors of intensive gardening, transport logistics and reprocessing of products.

V. *Plain Ecosystems.* These differ from other types due to high anthropogenic influence. It is divided into 4 mini-ecosystems: the ecosystem of unfarmed upland plain, the ecosystem of farmed upland and inter-hills plain, the ecosystem of farmed trans- and pre-Syrdarya plain, the ecosystem of the unfarmed trans-Syrdarya sandy plain.

Tenth type: the ecosystem of the unfarmed upland plain. Such ecosystems are located in the southeastern and central parts of Pap and consist of young eol and proluvial deposits of Quaternary period. Deformed because of deflation and erosion. Due to sharp continental climate, low level of rainfall (max. 140-160 mm), and presence of strong Kokand wind during spring vegetative period decreases the quantities of biological variety. From flora, ephemers and ephemeroids are found. In the soil with high salt salinity, only a few plants such as lilac and camel-thorn grow. On the edges of temporary creeks, there are short seasonal plants such as horsetail, palm grass, and plantain. Tortoises, desert rabbits, upland snakes,

porcupines, and gophers, together with some birds like owls, kites and upland sparrows are habitants of the ecosystem. People use this ecosystem year-round for cattle grazing.

Eleventh type: the ecosystem of farmed upland and inter-hills plain. Such ecosystems include the mainlands of the region intensively used in agriculture. This ecosystem is divided into 3 inter-hills plains: Chust - Olmos - Gova - Varzik; Kosonsoy, Iskovot - Zarkent – Peshkurgon. The soil here formed on loess and loess-type substances of the Quaternary period, relief goes down from north to south. Therefore, the soil is a typical light seriosem and very fertile. The main types of agriculture are cotton, wheat, corn, and intensive gardening. The area produces the main part of regional agricultural products.

Twelfth type: the ecosystem of farmed trans- and pre-Syrdarya plain. The soil of the ecosystem located on alluvial deposits of floodplain and three terraces of Norin, Karadarya, and Syrdarya rivers is hydroform meadow, bog-meadow, and auto morph meadow. Cotton and wheat are grown in this area, together with developed long-period gardens. The bushes formed by the river, are covered with green grass under the trees. There are many springs on the edges of the river. Originally formed as ecosystem the right edge of Syrdarya, are consists of loess steep bank of 40-65 meters height. They are the place of habitat for wild pigeons, owls, and sparrows. In the bush areas of the rivers and creeks, birds from a specific biotope. In almost all water pools muskrats are a very common animal. In Podshootasoy and Govasoy sometimes there can be seen otters. In addition, pheasants, jackals, wild bush cats and some types of ducks are also found. In the Norin river, the most spread types of fish are trouts, schizothoraxs, and barbels.

*Thirteenth type: unfarmed trans-Syrdarya sandy plain***.** This ecosystem is situated in sandy Central Fergana massive of Mingbulok district. The massive formed due to eol deposits of Syrdarya and Central Fergana. Its relief consists of conus-type sand dunes height of which 2-3 meters and length 6-8 meters. The groundwater is very close to the surface, therefore, areas between dunes are covered with holophytes, red and black saxauls. Reptiles such as monitors, lizards, speed lizards, tortoises, desert snakes, mammals – desert yellow foxes, jackals, desert rabbits, and hedgehogs are found in the ecosystem.

Conclusion

The rapid development of the tourism industry in Uzbekistan, including ecotourism, has become an issue of very high importance. However, determining tourism potentials and their approaches to their implementation to practice carry regional importance. Therefore, in the example of the Namangan region, Experience assessment of the ecotourism potential in terms of ecosystems has been proved as the optimal approach. This meteorological approach suits the research object and objectives of ecology. The ecotourism potential of the region has been assessed by separating 13 ecosystems on the medium-scaled eco-tourism map of the region and dividing them into 4 areas according to their ecotourism importance.

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