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YASHIL GOL'S ECO-TOURISM POTENTIAL: STUDY CASE

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ABSTRACT

The richest eco-tourism potential and real ecosystem of Yashil Gol were studied using remote sensing methods in aerospace sources. Based on these materials, the eco-geographical factors of the lake were revealed using OpenStreetMap and Google Earth. The lake territory comprises 2,551 m² (0.26 ha), and the total perimeter of the lake circle is 202.4 m. The lake's absolute height is about 909 m above sea level, and the relative height is 1.37 km. The lake shape resembles an oval leaf from space. Consequently, the map length is 76.60 m, but the ground length is approximately 76.96 m, with a heading of 193.43° on the Google Earth map. The lake's map width is 63.37 m, but the ground width reaches 63.39 m, with a heading of 90.59 ° on the Google Earth map. Yashil Gol is located at 40°45'35"N latitude and 48°32'19"E longitude. The eco-tourism reserves of Yashil Gol haven't been studied by researchers today. Correspondingly, the climate conditions of the lake territory were investigated, and the data are presented in the paper. According to Landsat and other aerospace materials, as well as visits to the lake throughout the four seasons, monitoring deals with climate, forest, and visitor impacts. The woodland cover square around the lake was defined as about 0.88 ha within a 678 m perimeter. There is only one small café on the lakeshore. None of the cottages, hotels, or hostels are located here. Orthofauna members are observed in Autumn as wild birds migrate to warmer areas. The birds are mainly included in the «Green Book» and «Red Book» of the Republic. To investigate the entire ecosystem of Yashil Gol, researchers from various scientific fields must study it.

Keywords: Ecotourism, Aerospace Material, Radar Technique, Climate, Ecosystem.

1. INTRODUCTION

Food Yashil Gol is a very interesting and extraordinary lake located within the borders of Pirgulu State Preserve, situated on the western side of Pirgulu Mountain in the territory of Galaderesi, adjacent to Galeybugurt village. The geographical location of the natural lake is between 40°45'35"N latitude and 48°32'19"E longitude[1,2,3]. The general view of the lake is exciting and attractive in all four seasons, appealing to visitors and tourists alike.

The water sources, such as Openstreet[1], Buckley[4], Butarbutar et al.[5], Meteoblue Climate[6], Edwin et al.[7], Harbi et al.[8], in Yashil Gol are drinkable and suitable for watering, and wild animals mainly utilize the lake's water. But it's not used in irrigation because the relief and the distance between the village and the lake don't allow for it. The visitors and the local population come here to swim in the lake during hot summer days. The natural distance between Yashil Gol and Shamakhi district is 16.09 km, but the distance between the Astrophysical Observatory and the same lake is 5.36 km[1,4,18,19,20]. The lake is observed from space among some mountains in the valley at 909 m above sea level. The calmness exists. As it is seen from the first Figure the climate differs in all seasons seriously. To develop the summer and winter

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tourism sector on the lake shore there's a profitable situation. Swimming, sailing (on a catamaran and a boat), and various attractions on the water may be organized in the territory. The eye altitude of the lake is 5.13 km, the elevation of the object is 912 m. The lake is far from the Galaderesi, about 1 km and 9.43 km distance to be gone for reaching Yashil Gol from the headway on Lahij-Pirgulu road, which has been developed lately. Because of the geographical location, the wind risk on the water surface is low. The green cover around the lake is reflected in its surface, which is why the lake is called Yashil Gol, meaning Green Lake in English.

Yashil Gol in Summer

Yashil Gol in Winter

Figure 1. Yashilgol Lake in Two Seasons

Also, the photo that describes the winter period of the lake shows that the surface water is frozen in the middle of the winter. Thus, skiing, skating, and scooting might be improved during winter months on the Yashil Gol surface. It snows gently around the lake and also on the ice covering the water. Swings can be mounted on the lakeshore between the high trees, as seen in the photo below.

Around the lake shore in all seasons, photos taken in their natural condition prove the fact below. The landscape depicted in Figure 2 shows that a similar swing may be built in both lakes in Shamakhi, as well. The distance between the lake is equal to 9.05 km. Chukhuryurd Lake has a milder winter compared to Yashil Gol, but it attracts visitors as the first one; thus, the lake isn't completely frozen like the one studied. Winter arrives at the end of November, accompanied by snowfall due to the elevation and geographical location, and lasts for approximately 3.5 months. In this season, nights are too freezing and long. The amount of sunny days rapidly decreases. The average temperature data change ranges from -8 to -15°C.

Spring is felt at the beginning of March, marked by the noise of nightingales and the melting of the lake's ice cover. Greening occurs in the bushes and trees around the lake. The birds built the nestles. Migratory land birds and waterfowl come back to the lake till the end of summer or sometimes Autumn. Unlike the last seasons described above, summer comes too early here.

Phyto-diversity[1,3,21,22,23] (field plants, bushes, trees, bush-trees) of the local forest consists of 0.88 ha in the circle of 678 m perimeter. The coniferous trees, hornbeam, blackberry bushes, alder, cornel, valerian, cedar, peanuts, and river buckthorn are characteristic of the woodlands. The alternation of the seasons in the lake territory reveals different landscapes around and on the water surface of the lake.

Summer generally starts in May, but the swinging term begins in July. Thus, the higher temperature indexes are observed in July here. The sky becomes clearer due to

fewer cloudy days. The weather temperature increases to 35°C, and sometimes it may decrease to 31°C. The best swimming time occurs in July, particularly due to the higher water temperature. Autumn arrives at the end of August and lasts until November, bringing a sense of sadness to the lake landscape[1,2,22,23]. As a result, the lake is mostly left by visitors, unlike during the summer period. The color of the lake remains unchanged and stays green. All woodland becomes orange or golden in color. It rains too often and too strongly in the long term.

In Yashil Gol Lake In Chukhuryurd lake

Figure 2. Giant Trees for Tourists' Swinging Adventure on the Lake Shore

The scope of the research on the Yashil Gol Lake consists of monitoring the climate parameters of the Yashil Gol ecosystem, assessing its ecological diversity, evaluating the sustainability of Yashil Gol eco-tourism, and examining the environmental impacts of potential ecotourism development.

2. RESEARCH METHOD

The research object is the lake ecosystem and its surrounding landscape, known as Yashil Gol, which translates to Green Lake. Exploration of Yashil Gol's vast potential for eco-tourism and its existing ecosystem, utilizing advanced remote sensing methodologies and data sourced from aerospace platforms. This approach facilitated the discernment and subsequent mapping of the lake's eco-geographical features onto OpenStreetMap and Google Earth. The research object spans an area of 2,551 m² (0.26 ha) with a total perimeter of 202.4 m.

Positioned at an absolute elevation of 909 m above sea level and a relative height (eye altitude) of 1.37 km, the lake assumes a distinctive elliptical, leaf-like configuration when viewed from space. The mapped dimensions revealed a length of 76.60 m and a width of 63.37 m, which were validated by on-the-ground measurements of 76.96 m and 63.39 m, respectively. The lake's orientation is specified as 193.43° for length and 90.59° for width on the Google Earth map. The studied lake ecosystem is geographically located at 40°45'35"N latitude and 48°32'19"E longitude. Despite boasting significant potential for eco-tourism, the reserves of the picturesque lake have mainly remained uncharted by researchers to date. An in-depth scrutiny of the climate conditions in the lake's vicinity was conducted, utilizing data from Landsat and other aerospace sources, supplemented by on-site inspections across all four seasons.

The research encompassed a comprehensive monitoring program for climate patterns, forest ecosystems, and visitor activities. The woodland coverage surrounding the lake was approximately 0.88 ha, forming a perimeter of around 678 m. Noteworthy is the conspicuous absence of cottages, hotels, or hostels in the proximity of the lake, with only a modest café situated along its shoreline.

Observations of ortho-fauna members, particularly during the autumn season, include the migratory patterns of wild birds seeking warmer regions. Many of these avian species are acknowledged in the Republic's "Green Book" and "Red Book," underscoring their ecological significance.

The satellite and OpenStreetMap views of the lake are presented below for comparison with the natural setting. Investigate whether Yashil Gol and its surrounding areas act as wildlife corridors, facilitating the movement of terrestrial fauna. Explore the interactions between aquatic and terrestrial ecosystems. Explore the microbial diversity within the lake, emphasizing the roles of bacteria and other microorganisms in maintaining water quality and nutrient cycling.

Figure 3. Aerospace Map of Yashil Gol, 2023

This study emphasizes the critical need for a thorough examination of Yashil Gol's complete ecosystem, extending a welcome to researchers across diverse scientific domains to contribute their specialized insights. Discuss key water quality parameters, including pH, dissolved oxygen, and nutrient levels. Assess any human-induced impacts on water quality and potential conservation measures. Examine the effects of tourism and recreational activities on the ecology of Yashil Gol. Discuss sustainable tourism practices and conservation initiatives aimed at minimizing negative impacts[1,6,20,21]. Consider the lake's resilience to climate change, including shifts in temperature and precipitation patterns.

Yashil Gol is a lake situated in the Shamakhi region, renowned for its stunning natural landscapes. This traditional natural site is also highly suitable for summer tourism. Some key factors that contribute to the quality of summer tourism in Yashil Gol can be analyzed based on the following factors: natural beauty, hiking and natural trails, photography opportunities, interesting events, and festivals. Tourists can find hiking trails and nature paths in the vicinity of Yashil Gol. These trails offer an excellent choice for those who want to blend in with nature and take in the beautiful views around the lake. If you wish to obtain more specific information about spring tourism in the Yashil Gol area, it is advisable to contact local tourism consultants, tourism authorities in the Shamakhi region, and local guides. Evaluate ongoing research or conservation projects focused on enhancing the ecosystem's climate[1,15,16] resilience. Understanding the ecology of Yashil Gol provides valuable insights into the delicate balance of its ecosystems.

Figure 4. Frozen Lake in Winter Photo by Dron, 2023

Figure 5. General View of Green Lake

As seen in Figure 3, the lake is green in Autumn when it's unfrozen and is in torques under the ice cover. Therefore, the main coloring of the water comes from the deep part of the lake, while the surrounding landscape emphasizes its depth. The tracks of car tires on the snow prove that tourists used to visit the lake even in cold and severe freezing weather. Under the winter sun, the lake's surface shines and creates an attractive mood for the ecosystem of the studied lake. Yashil Gol, nestled in the picturesque Shamakhi region of Azerbaijan, is not just a body of water but a thriving ecosystem that exhibits a diverse range of flora, fauna, and intricate ecological dynamics.

Explore the presence of submerged and emergent plants in the lake, such as water lilies, reeds, and aquatic grasses. Colorful flowers, trees, and the lake itself create a beautiful and relaxing environment for tourists. The overarching objective is to gain a comprehensive understanding of this natural habitat, encompassing its ecological dynamics, climatic variations, and biodiversity considerations. The aerospace ortho-photos of the lake in Autumn and winter are given below. The frozen lake keeps her attractiveness and picturesque landscape in winter, too. Despite the cold weather around the lake, tourists built a camp for the night to rest in the cold air conditions, and it is worth noting that this trip was enjoyable for them. Discuss their ecological roles in oxygen production, nutrient cycling, and habitat provision. Investigate the diversity of fish species inhabiting Yashil Gol. Highlight the environmental significance of these species, their role in the food web, and any conservation efforts aimed at sustaining their populations.

Yashil Gol may serve as a crucial habitat for migratory birds. Identify and describe the bird species that frequent the lake, emphasizing their ecological importance, nesting behaviors, and any conservation measures in place. Examine the woodland or forested areas surrounding Yashil Gol. Discuss the composition of tree species, the role of forests in maintaining water quality, and their contribution to overall biodiversity.

While studying the eco-tourism potential of any lake ecosystem, the first important factor is the water temperature for attracting visitors and the ortho-fauna members to the lake. That's why the water temperature has been measured during a 5-year monitoring period (2017-2023) and is given below. However, winter tourism generally becomes a significant factor in environmental conditions and ecology. Efforts to preserve the ecological balance during winter and measures taken for the conservation of wildlife and the environment[1,5,13,14,15,17] are essential during winter activities in tourist areas. The impact of such activities on nature and environmental sustainability efforts is monitored and evaluated by environmental conservation agencies. For current information on winter tourism and the ecological situation around Yashil Gol, it is recommended to contact local environmental protection agencies, tourism offices, or relevant government authorities. These organizations typically monitor ecological conditions, coordinate conservation efforts, and assess the impact of tourism on nature."

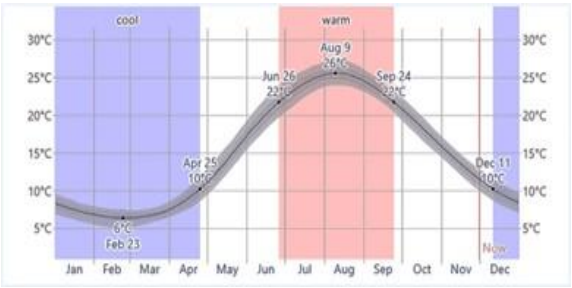

Figure 6. Water Temperature of Yashil Gol for the Months from 2017 to 2023.

From Figure 6, Openstreet Map[1], Brockerhoff et al.[3], Buckley[4], Butarbutar et al.[5], Meteoblue Climate[6], it is evident that Yashil Gol is an independent water basin, contributing to significant seasonal fluctuations in the average water surface temperature. The period characterized by the warmer water spans 3.0 months, commencing from June 26 and lasting until

September 24, during which the average water temperature exceeds 22°C[1,15,16]. August emerges as the warmest month, registering an average water temperature of 25°C.

Figure 7. Yashil Gol Photos in Mid-Summer, 2023

Conversely, cooler water prevails for 4.4 months, spanning from December 11 to April 25, with an average temperature dipping below 10°C. The coldest month for water in Shamakhi is February, marked by an average temperature of 7°C. The following landscape photo, taken at 2 pm and 5 pm on the same summer day (mid-July) under a partly cloudy and partly sunny sky, shows the actual color of the lake's background.

This data underscores the distinct seasonality in water temperatures experienced in Shamakhi, providing essential insights into the cyclical nature of the local aquatic environment. The water purity of the lake is seen from the photos taken at the place under the sunshine. The lake is fed not only by underground water but also by atmospheric sediments (rain, snow, glaciers) and spring water. According to the aerospace materials, 50-year weather monitoring within the 1980-2020 climate parameters was analyzed, and the climate change, based on temperature (°C) anomaly and precipitation (mm) anomaly, has been revealed and is shown below in both graphs.

The upper graph, Figure 6, visually represents the monthly temperature anomalies recorded from 1979 to the present day. These anomalies indicate the deviation from the 30-year climate mean of 1980-2010, with warmer months depicted in red and colder months in blue. Across various locations, an observable trend emerges, showcasing an increase in warmer months over the years, a phenomenon attributed to the global warming associated with ongoing climate change. The lower graph focuses on precipitation anomalies for each month during the same period. This metric measures whether a month experienced more or less precipitation compared to the 30-year climate mean from 1980 to 2010. Months characterized by above-average precipitation are represented in green, while those with below-average precipitation are denoted in brown. This dual visualization provides insights into shifting precipitation patterns, highlighting instances of wetter (green) and drier (brown) months compared to established climate norms. By examining these graphical representations, one gains valuable insights into the evolving climatic conditions, witnessing not only the temperature trends associated with global warming but also the dynamic variations in precipitation levels over the years.

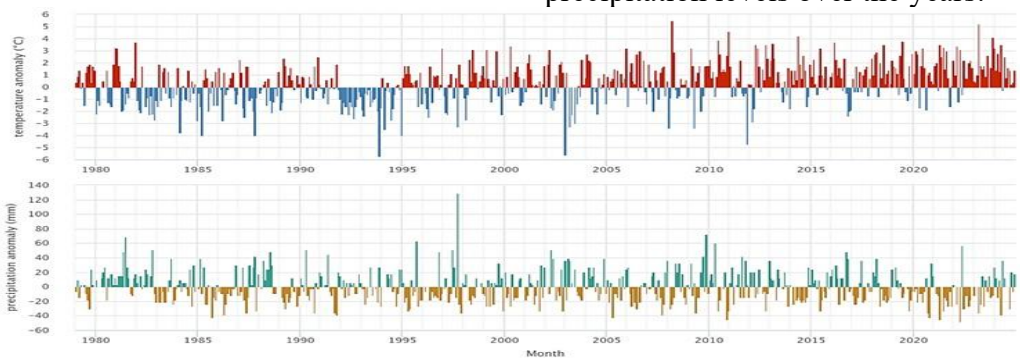

Figure 8. Monthly Anomalies of Temperature and Precipitation around Yashil Gol since 1979-2023[6]

3. RESULT AND DISCUSSION

The assessment of the tourism potential, climate conditions, and ecological status of Yashil Gol in the Pirgulu region can be realized by considering climate conditions, ecological status, tourism potential, environmental sustainability, relief, transportation, and route.

Shamakhi typically experiences a continental climate. The climate assessment should encompass the duration of warm and cold seasons, average temperatures, and precipitation levels[1,5,21,22]. Additionally, the impact of these climate conditions on the local wildlife should be taken into consideration. Factors such as ecosystems around Yashil Gol, vegetation, water quality, and environmental health should be considered. Evaluation of the preservation of natural areas, sustainable management of biodiversity, and reduction of environmental impacts in the region should be undertaken. The region's tourist appeal should be assessed based on the landscapes, activities, and other tourist amenities offered by Yashil Gol.

Infrastructure, accommodations, transportation, and other tourism services should also be considered to attract visitors to the area. The impact of tourism activities on the region should be evaluated, with a focus on environmental sustainability. Preservation of natural resources, minimizing environmental impacts, and involving local communities in the process should be key considerations. These assessments can be conducted to preserve the ecological richness of the region, promote tourism, and establish a sustainable development model. The climate conditions of the "Yashil Gol" (Shamakhi, Azerbaijan) region can be summarized as follows:

The Shamakhi region typically experiences a continental climate characterized by a distinct separation between warm and cold seasons. Below are average temperature ranges and some important dates, based on which the warm and cold seasons differ completely

During the warm season (May 30 - September 11), it is a 3.4-month period during which the average high temperature is above 78°F (25.6°C). The highest temperature is recorded in July, averaging 87°F (30.6°C). The lowest temperature this season, observed in July, is around 61°F (16.1°C).

In the Cold Season (November 19 - March 14), it is the 3.8-month period during which the average high temperature is below 48°F (8.9°C). The lowest recorded temperature is 23°F (-5°C) in January. The highest temperature this season, observed in January, is around 38°F (3.3°C). These details reflect the varying temperature conditions of the "Yashil Gol" region throughout the seasons. To clarify the climate situation, all details were taken into consideration for the lake basin and the surrounding territory. Severe frost is a crucial factor for visitors to be prepared for any difficulties. Thus, the temperature difference should be monitored on a regular basis in the region and around the lake for both warm and cold periods of the year.

Winds Openstreet Map[1], Brockerhoff et al.[3], Buckley[4] can contribute to cloud formation by transporting water vapor. The intensity and direction of the winds are important factors influencing cloudiness. The level of cloudiness can vary from a visually clear sky to a completely overcast sky. This condition can be determined through meteorological observations[1,22,23] and measurements conducted in the region. Additionally, understanding the daily and seasonal variations in cloudiness is crucial for comprehending and predicting the local climate. The climate conditions provide an opportunity to develop the eco-tourism sector around Yashil Gol. The ecotourism of Yashil Gol represents a sustainable tourism model developed to preserve natural wealth and ecological balance. Various elements in this ecotourism domain[1,9,10] include goals such as maintaining biodiversity in the region, supporting the local economy, and providing environmental education to

visitors. The ecotourism of the study object adopts a perspective focused on preserving the region's unique natural wealth. Sustainable tourism practices offer visitors an exceptional experience that minimizes their impact on the surrounding ecosystems. Ecotourism supports and encourages local biodiversity[1,5,11,12]. Visitors can contribute to conservation efforts by observing endemic plant and animal species, raising awareness of biodiversity among a broader audience. The lake's ecotourism has the potential to stimulate the local economy. Tourism-

Related sectors, such as accommodation, food and beverage, guiding, and handicrafts, provide employment and income to the local population, supporting sustainable development. Programs designed to provide environmental awareness and education to visitors constitute a critical aspect of the lake's ecotourism. These educational initiatives can increase awareness of conservation, sustainability, and ecological consciousness.

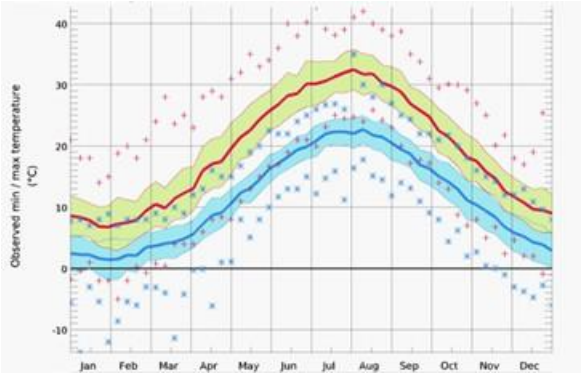

Figure 9. Minimum and Maximum Temperature around Yashil Gol[1,6]

The warm season in Shamakhi spans 3.4 months, starting from May 30 to September 11, during which the average daily high temperature exceeds 78°F. The peak of heat is experienced in July, with an average high of 87°F and a low of 61°F. Conversely, the cold season persists for 3.8 months, beginning from November 19 to March 14, characterized by an average daily high temperature below 48°F. January is the coldest month in Shamakhi, with an average low of 23°F and a high of 38°F. Thus, the climate medium of Yashil Gol allows the different tourism sectors to be developed in the territory widely in all seasons.

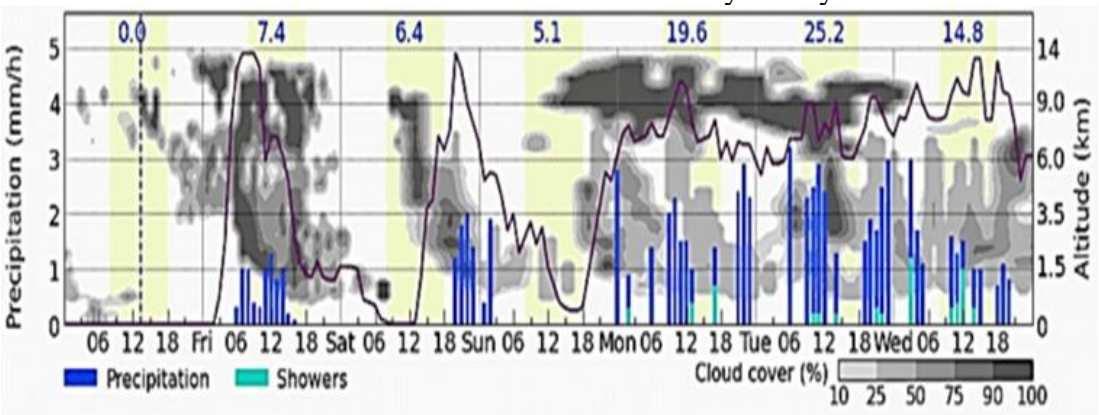

Figure 10. Average Precipitation and Cloud Cover of Yashil Gol Basin by Radar RSM

As shown in Figure 8, the general climate of the region where Yaşıl Göl is located influences cloud formation. In warm and humid climates, increased evaporation and condensation can lead to an increase in cloud formation. Seasonal changes are a significant factor influencing cloudiness. For example, cloudiness generally increases during rainy seasons. Geographical features such as elevation, mountains, and forested areas[1,3,6,7] can also influence cloudiness. Cloud formation is often observed in mountainous regions. Ecotourism projects encourage collaboration with local communities and non-governmental organizations. This fosters more effective

environmental conservation efforts, ensuring that communities benefit fairly from tourism activities. In conclusion, Yashil Gol's ecotourism represents a significant tourism model for sustainably evaluating and preserving natural resources. This approach not only preserves the beauty of nature but also supports local economic development, contributing to the vision of leaving a healthy and livable environment for future generations.

4. CONCLUSION

Monitoring the climate parameters of Yashil Gol reveals essential patterns that guide sustainable tourism planning and ecosystem preservation. The area's rich ecological diversity, marked by endemic species and unique habitats, underscores its value as a natural heritage site. Evaluating the sustainability of eco-tourism in the region highlights both its promise and the need for careful, community-based management. While ecotourism offers economic and educational benefits, its development must be approached with strict environmental safeguards to minimize impact. Ultimately, Yashil Gol's future as an ecotourism destination depends on a balanced integration of conservation, local engagement, and responsible tourism strategies.

REFERENCES

1. Openstreet Map. Aerospace Map of Yashil Gol. https://www.openstreetmap.org (accessed in October, 2023)
2. Achigsoz, S., Gulay, C., et al. Linkages Among Ecotourism, Landscape and Natural Resource Management, and Livelihood Diversification in the Region of Sugla Lake. *International Journal of Sustainable Development World Ecology*, 2016; 23(1): 15-27.
3. Brockerhoff, E.G., et al. Forest Biodiversity, Ecosystem Functioning and the Provision of Ecosystem Services. *Journal of Biodiversity Conservation*, 2017; 26(2): 305-335.
4. Buckley, R. Tourism and Environment. *Annual Review of Environment Resources*, 2011; 36 (3): 397-416
5. Butarbutar, R. et al. Environmental Effects of Ecotourism in Indonesia. *Journal of Indonesian Tourism Development Studies*, 2013; 1(3): 97-107
6. Meteoblue Climate, Climate condition of Yashil Gol. https://www.meteoblue.com/en/weather/agriculture/meteogramagro/shamakhi-rayon_azerbaijan_585030 (accessed in September 2023)
7. Edwin, M., et al. Assessment of Natural Resources and Local Community Participation is Nature-Based Tourism of Wehea Forest, East Kalimantan. *Tropical Forest Management Journal*, 2017; 23(3): 128-139.
8. Harbi, J., et al. Making a Bridge Between Livelihoods and Forest Conservation: Lessons from Non-Timber Forest Products' Utilization in South Sumatera, Indonesia. *Forest Policy Economics*, 2018; 94(2): 1-10
9. Kamaludin, K., et al. Strategy Formulation of Balek Angin Lake as an Ecotourism Attraction to Support Sintang Regency's Sustainable Development Program. *Journal of Indonesian Tourism Development Studies*, 2020; 8(3): 165-173
10. Nugroho, I., et al. The Planning and the Development of the Ecotourism and Tourism Village in Indonesia. *Journal of Socioeconomics,* 2018; 1(1): 43-51
11. Rahma, N.E., et al. Valuation of Ecosystem Services of Tropical Forests: A Case Study of Several Villages in East Kalimantan. *Journal of Development Research*, 2020; 2(2): 67-78
12. Reinhart, H., et al. Speleogenetic Process of the Suaran Block, Karst of Sangkulirang-Mangkalihat, East Kalimantan. *Web of Conferences, Pek. Indonesia, Jul*., 2020; 200-206

13. Roy, J., Exploration of Rural Tourism in the Merabu Village Forest. *Journal of Pesona Tourism*, 2021; 6(1): 36-48
14. Sihite, R.Y., Priority Natural Tourist Attraction Potential in the Work Area of KPH Unit XIII Gunung Rajabasa, Way Pisang, Batu Serampok, Lampung Province. *Journal of Sustainable Forests*, 2018; 6(2): 84-93
15. Sisriany, S., et al. Ecotourism Policy Research Trends in Indonesia, Japan, and Australia. *The Journal of Tropical Forest Management*, 2020; 26(2): 178-188
16. Mammadova, U. Caspian-Sea Ecotourism Potential: Sustainable Development and Conservation Perspectives. *The 13th International and National Seminar of Fisheries and Marine Science (ISFM XIII 2024), BIO Web of Conferences, November 11*, 2024; 136, ANo:04006:1-10.
17. Mammadova, U. Effect of Humic Substances on Yield and Nutrient Contents of Eggplant Santana (*Solanum melongena*) Plants in Gray-Brown Soil. *Eurasian Journal of Soil Science*, 2023; 12(1): 98–103
18. Mammadova, U. *Estimation of the Renewable Energetic Potentials: Case Study in Azerbaijan.* Advances in Energy Research Energy and Power Engineering. 1st ed, NOVA, 2013: 557-583
19. Mammadova, U. The Effect of Bio-Humus on Cardinal Grape Yield (*Vitis vinifera* L.) and Nutrient Contents of Dark Brown Soil using Drip Irrigation Systems under The Open Field Conditions. *Eurasian Journal of Soil Science*, 2022; 11(4): 345–352, 2022
20. Mammadova, U. Wind Energy Potential Estimation in Pirgulu Region. *American Journal of Environmental Engineering*, 2012; 2(4): 109-113
21. Sandhyavitri, A., et al. Reduction of Carbon Emissions from Tropical Peat Land Fire Disasters Using Weather Modification Technology. *Environment and Ecology Research*, 2023; 11(5): 834–848
22. Wang, L.E. Ecotourism Environmental Protection Measures and Their Effects on Protected Areas in China. *Journal of Sustainability*, 2014; 6(10): 6781-6798
23. Nur, C., & Majid, F. The Effect of Sprint Training on Vertical Jump Height of Female Youth Volleyball Players. *International Journal of Human Movement and Sports Sciences*, 2021; 9(2): 334-339