Geojournal of Tourism and Geosites
ISSN 2065-0817, E-ISSN 2065-1198

Year XVIII, vol. 58, no. 1, 2025, p.32-41
DOI 10.30892/gtg.58103-1388

# DEFINING A SUSTAINABLE TOURISM PERSPECTIVES IN EASTERN PART OF BALKHASH-ALAKOL BASIN

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**Citation:** Rakhimzhanova, G., & Mussina, K. (2025). Defining a sustainable tourism perspectives in eastern part of Balkhash-Alakol Basin. *Geojournal of Tourism and Geosites*, 58(1), 32–41. https://doi.org/10.30892/gtg.58103-1388

**Abstract:** This study focuses on the existing shortcomings of greening, absence of parks for long-term development of Eastern part of the Balkhash-Alakol Basin (Destination). We identifyed these issues through GIS analysis. And study aims to underline the importance of Destination's green development. We had done verification visually by radar and optical images by using GIS technology, as well as by field survey methods land surface cover with a wide homogeneous flatland and the absence of forest cover in the territory of the study Eastern part of the Balkhash-Alakol Basin. In addition, using GIS analysis we identified Destination's area growth from 944 to 1 437 square meters (in the period from 2013 to 2023). In order to define Destination's sustainable perspectives, we carried out regression analyses of air traffic of domestic and international destinations with the correlation of national currency to USD. Analyses show that regression reveals a 38.9% of error of prediction, indicating a moderate level of explanatory power in the model. This suggests that nearly 60 % of the variability in domestic air passenger numbers can be explained by the combination of international passenger volumes and fluctuations in the national currency rate (Tenge) to USD. Given the Destination's growth and the variability in domestic, international passenger numbers, it is necessary to create conditions for the development of Alternative Ecosystem Services in the form of specialized green parks, green lanes, and tourist pathways. This approach can lead to the creation of green areas and parks that not only provide recreational opportunities but also contribute to the conservation of biodiversity, cultural integrity and the overall well-being of the local community. Also, considering the existing environmental issues, an important perspective is to sustain the life cycle of the Destination in the stage of green development.

**Keywords:** the GIS analyses, regression analyses, domestic and international passengers, greening, alternative ecosystem services, sustainable development

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## INTRODUCTION

Today, the Republic of Kazakhstan (hereinafter - Kazakhstan) is putting the efforts in the sustainable development way. This development also relates to the natural and unique Tourist Destinations of Kazakhstan. Nowadays Kazakhstan's biodiversity and ecosystems create high economic value for many sectors of the country's economy and stakeholder groups. Kazakhstan has focused on developing knowledge and skills related to the green economy, developing small and medium-sized enterprises and strengthening the capacity of local communities. Additional attention was paid to the introduction of new opportunities such as Eco-tourism, protected areas (Asian Forest Corporation Organization, 2022).

Meanwhile, the Travel & Tourism Competitiveness Reports indicate that there is a fluctuation in the indexes of Environmental Sustainability, Human, cultural and Natural resources of Kazakhstan's tourism competitiveness, and the country having a low score predominantly a decline have been shown in the indexes between 2007 and 2024 (Figure 1). Moreover, Kazakhstan is one of the countries with low forest cover. According to the Committee of Forestry and Wildlife of the Ministry of Ecology, Geology and Natural Resources the Kazakhstan forests occupy 5% of the country's territory, with an area of 13.6 million hectares, saxaul accounts for almost half of this (UNDP Kazakhstan, 2022).

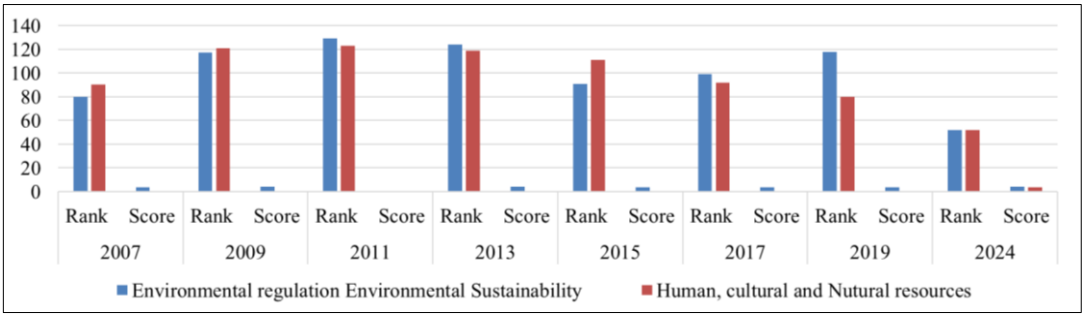


Figure 1. Travel & Tourism Competitiveness Report: Authors' data processing

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According to the Concept of the development of the tourism industry of Kazakhstan in the tourist season increases the impact on resort areas (destinations). And it is necessary to emphasize the issue of arrangement of tourist routes (walking trails, bicycle routes). Despite the huge potential, except for the territories of state National Natural Parks and Natural Museums-Reserves, many trails are insufficiently equipped, which does not allow tourists to walk comfortably. In order to ensure the safety of tourists and increase the comfort of travel, it is important to ensure that approaches to the development and classification of walking trails throughout Kazakhstan are in compliance with a single standard (Concept of development of the tourism industry of the Republic of Kazakhstan for 2023 - 2029 year, 28.03.2023: 10-12). Maintaining tourism and environment are balanced, it helps to create socio-ecological resilience of an area (Heslinga et al., 2020).

Furthermore, there are also issues of rational use of water resources in Protected Natural Territories (Tourist Destinations) of Kazakhstan in the way of green and sustainable development. On of the beautiful Tourist Destination surrounded by Lake Alakol (hereinafter – The Destination), there are numerous islands, rafts, spits, coastal and emergent vegetation attract masses of nesting and migrating birds. The region is a crossroads of migration routes for bird populations traveling on the one hand, to winter in India from Central and Northern Kazakhstan and Western Siberia, on the one hand, and to the Arabian Middle Eastern and North African wintering grounds on the other (Fauna and flora of Lake Alakol, Research Institute for Environmental Problems, 2014). And Lake Alakol is underlined as one of the attractive lakes for recreation. According to indicative analysis, presumably in the future in average and short-water years should be expected to reduce the level of Lake Alakol (Results of water management estimates, the General Scheme of integrated use and protection of water resources, legal acts Republic of Kazakhstan, 2016).

There are not enough natural woodlands, the main ecological impact from tourists affects directly on Lake Alakol located in the Destination. The shoreline of the lake is eroding every year and the lake itself is getting more polluted. In this regard, nature protection measures should be developed in the territory of the Destination. And for the local and foreign tourists coming to the Destination, there are main tourism activities seaside viewing and swimming.

Climatic conditions surrounding the lake are sharply continental, which is characterized by semi-arid zone of East Kazakhstan, also the landscape of the lake is not afforested surface with steppe type of vegetation cover (Jiyenbekov et al., 2019). Also, the Destination has faced significant anthropogenic impacts in recent decades, extensive flooding and loss of agricultural land surrounding Alakol Lake (Valeyev et al., 2019). The area suffers from environmental issues, particularly anthropogenic pressures on aquatic Ecosystem services and shorelines.

Maximum observed water temperature and minirilization of Lake Alakol were assessed as the main environmental variables affecting fish distribution on a local scale. Environmental change leads to homogenization of the fish fauna as a result of the disappearance of rare species and invasion of alien organisms (Mamilov et al., 2021).

Study of the Ecological condition of Lake Alakol in Zhetysu region shows that concentrations of heavy metals in soil samples taken from the shores of Lake Alakol is twice as high as the maximum permissible concentration for cobalt, and 1.75 - 3.67 times higher than the maximum permissible concentration for manganese (Seitova et al., 2023).

Degradation of zonal natural geosystems of the Destination, primarily alluvial and foothill alluvial-proluvial plains, causes a decrease in the number of plant and animal species inhabiting the geosystem. Given above, there is a need to develop Eco-tourism in the Destination. The development of Eco-tourism requires specialized green parks and green areas. For example, the creation of Eco Park can contribute to the long-term development of the Destination.

And prolongation of the life cycle of the Destination with considering environmental issues, such as the preservation of Lake Alakol by offering Alternatives Eco System Services of the specialized green parks. In addition, we conducted statistical calculations Destination's area with the comparison National currency rate to USD. Here, we carried out the Table 1 of Destination area grows for 2013 to 2023 and National currency rate to USD (National bank.kz), for the statistical calculations Area is taken by **Y**, Currency rate is **X**, for further calculations Mean value of columns is indicated as - **m**.

Table 1. Destination's area with the comparison National currency rate to USD: Authors data processing (* Natinal bank.kz)

| **Year** | **Area (square meters)** | **USD** | **National currency of the Republic of Kazakhstan *** |
|---|---|---|---|
| | **Y** | | **X** |
| 2013 | 944 | 1 | 152 |
| 2014 | 944 | 1 | 179 |
| 2015 | 957 | 1 | 222 |
| 2016 | 1 168 | 1 | 342 |
| 2017 | 1 279 | 1 | 326 |
| 2018 | 1 283 | 1 | 345 |
| 2019 | 1 336 | 1 | 383 |
| 2020 | 1 338 | 1 | 413 |
| 2021 | 1 426 | 1 | 426 |
| 2022 | 1 434 | 1 | 460 |
| 2023 | 1 437 | 1 | 456 |
| **m** | **1231** | | **337** |

As result, we have all the need parameters for Covariance calculation (Coefficient of variation, a statistical measure) in Microsoft Excel 2010 (Table 2). Here, in Microsoft Excel 2010 we can find the COV operator, which looks like:

COV = (Y-Ym) (X-Xm) / (X-Xm)2* (Y-Ym) 2) ^ 0,5

There are, Y- dependent variable; X-Independent variable; Xm-mean of X; Ym-mean of Y.

Final, operations with COV operator in Microsoft Excel 2010 returns us the Covariance between the Destination area grows and National currency rate to USD as: **Cov 0,973275209**

Table 2. Covariance calculation: Authors data processing

| Y-Ym | X-Xm | (Y-Ym)(X-Xm) | (X-Xm)2 | (Y-Ym)2 |
|---|---|---|---|---|
| -287,3 | -185 | 53078.9 | 34124.2 | 82562.2 |
| -287,3 | -158 | 45315.0 | 24877.9 | 82541.3 |
| -274,0 | -115 | 31435.3 | 13162.3 | 75076.0 |
| -63,4 | 5 | -334.5 | 27.8 | 4024.2 |
| 47,7 | -11 | -511.3 | 115.1 | 2271.8 |
| 51,7 | 8 | 427.4 | 68.4 | 2669.1 |
| 104,7 | 46 | 4843.1 | 2141.2 | 10954.5 |
| 106,7 | 76 | 8135.5 | 5817.5 | 11377.1 |
| 194,2 | 89 | 17333.5 | 7969.6 | 37699.5 |
| 202,3 | 123 | 24933.6 | 15196.2 | 40910.6 |
| 205,4 | 119 | 24494.3 | 14226.0 | 42174.2 |
| | | **209150.8** | **117726.2** | **392260.5** |

**Covariance 0,9 shows the strong correlation between two data set**

According to calculation the growing exchange rate of the USD to National currency may cause the growth of domestic tourism, and air tickets and hotel payments are linked to the given estimates. Also, the growth in the number of tourists in the territory of the Destination is due to the fact that Kazakhstan is transboundary by land routes, the geographical location allows only to reach the seas located far abroad only through air ways.

In turn, the price of airfare is linked to changes in the dollar exchange rate, respectively, the price of accommodation and living expenses are getting more expensive. While local Destinations can be reached by train, train tickets are subsidized from the state budget and therefore are not clearly linked to the dollar exchange rate (National Company Kazakhstan Temir Zholy, 2022). This creates a very high demand for local Destinations. Measurements of the area of the Destination using archived satellite images for 2013 to 2023 and changes in the exchange rate of the national currency against the US dollar show a high correlation between the two independent variables.

## STUDY AREA

### The Experimental part

The study area is Destination, located on the border of Abay region of the Kazahstan. There is Alakol Lake one of the largest hydrologically closed lakes within the Balkash-Alakol Basin (Figure 2).

The area of the lake Alakol (with islands) is 2,696 square kilometers. The volume of water is 58.56 cubic km. The length of the lake is 104 km, and the width is about 52 km (Jiyenbekov et al., 2019).

Figure 2. Coastal area - Alakol lake (eastern part), captured by Drone DJI Mini 2 (Source: Authors' field survey, 2023)

**Task for carrying out:** Verification visually by Radar and Optical images, as well as by field survey methods land surface cover with a wide homogeneous flatland and the absence of forest cover in the territory of the study Destination.

**Material and methods:** In the experimental part **two sources were used to analyze vegetation (green) cover, the first**, Earth observation component of the European Union's Space Programme **Copernicus** (2024) (Figure 3, 4).

Second, Sentinel – 1 constellation of two imaging Radar Satellites operated by European Space Agency.

Further,S1A_IW_GRDH_1SDV_20230516T121927_20230516T121952_048559_05D73A_FBOE.SAFA satellite image (hereinafter - GRDH) had been choose and derived from **Copernicus** Data Hub (Figure 3). Obtained by the

Copernicus Sentinel-1 satellite level of GRDH in 16 May 2023 allows us to observe the Destination's land surface and coastal areas of Lake Alakol. During experimental work the GRDH was processed by using Sectional Applications Platform SNAP (Figure 5 SNAP, ESA Open Access source Software).

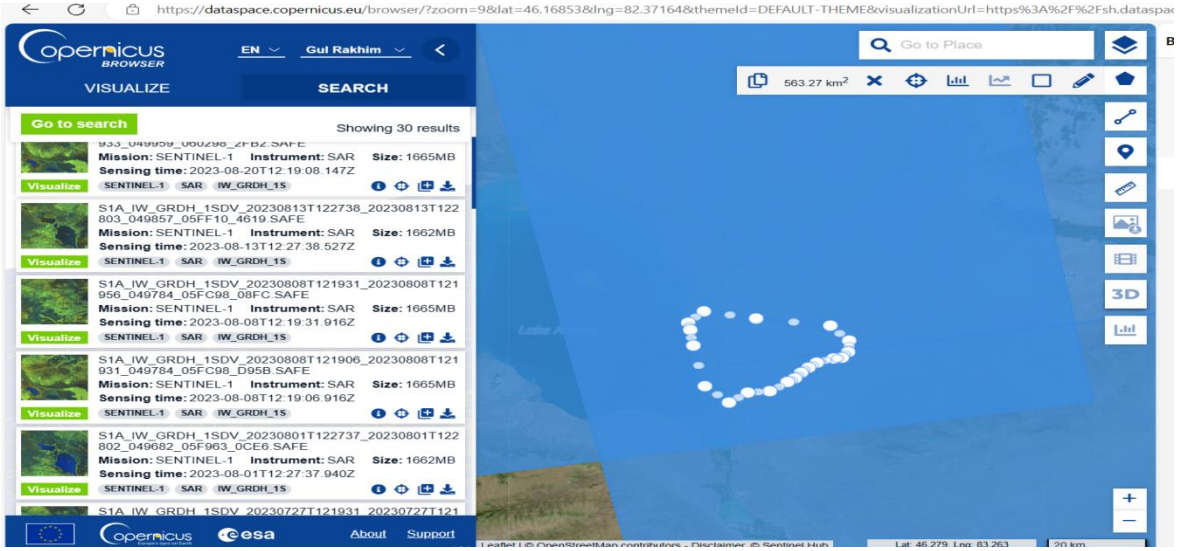


Figure 3. Copernicus Open-Access portal (Source: Authors' data processing)


Figure 4. Copernicus Data Hub., GRDH, 2024 (Source: Authors data processing)

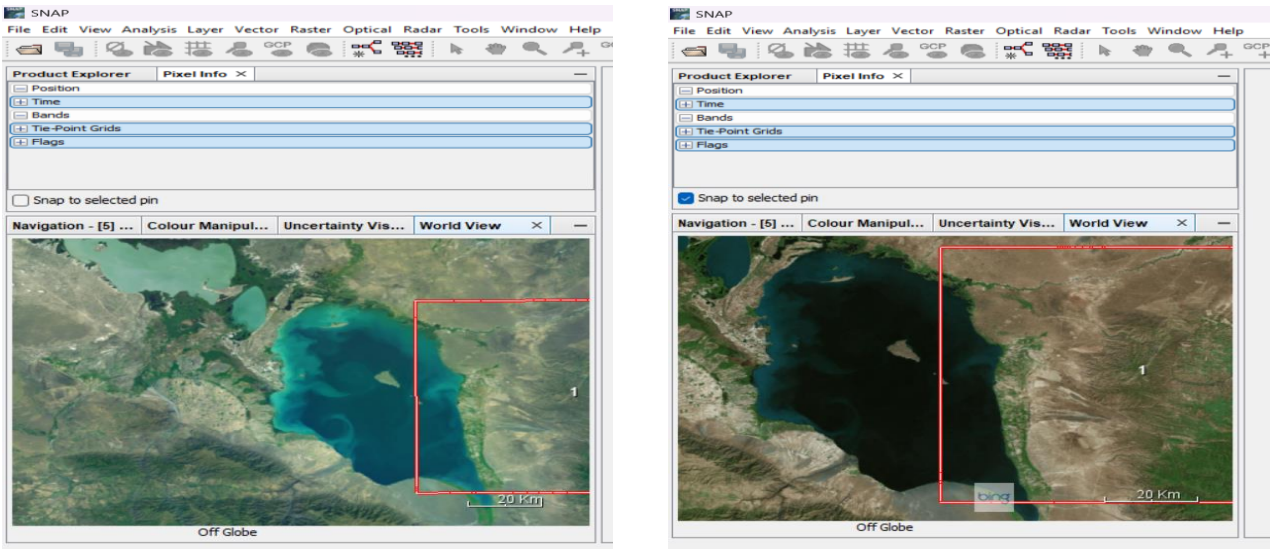


Figure 5. Sectional Applications Platform SNAP (Source: Authors' data processing)

Further, we had made following process in the SNAP: 1) Calibrations of the GRGH; 2) Geometric correction GRGH. As a result, we had received mask - Sigma Nought (Sigma 0). Further, Sigma 0 level data had been exported to Google Earth Software (Geographic Information Systems, Free Software), as a result we were able to analyze the areas with green coverage along the Alluvial Fans of the Tasty River. We was able to review that the Destination is dominated by wide homogeneous flatlands, the absence of forest cover (timber species), which, when analyzed visually using Google Earth, shows that indeed the territory of the homogenous flatlands are being predominated. Also, according to the visual analysis of the image, shrubbery is observed in the coastal side of the Destination (Figures 6, 7).

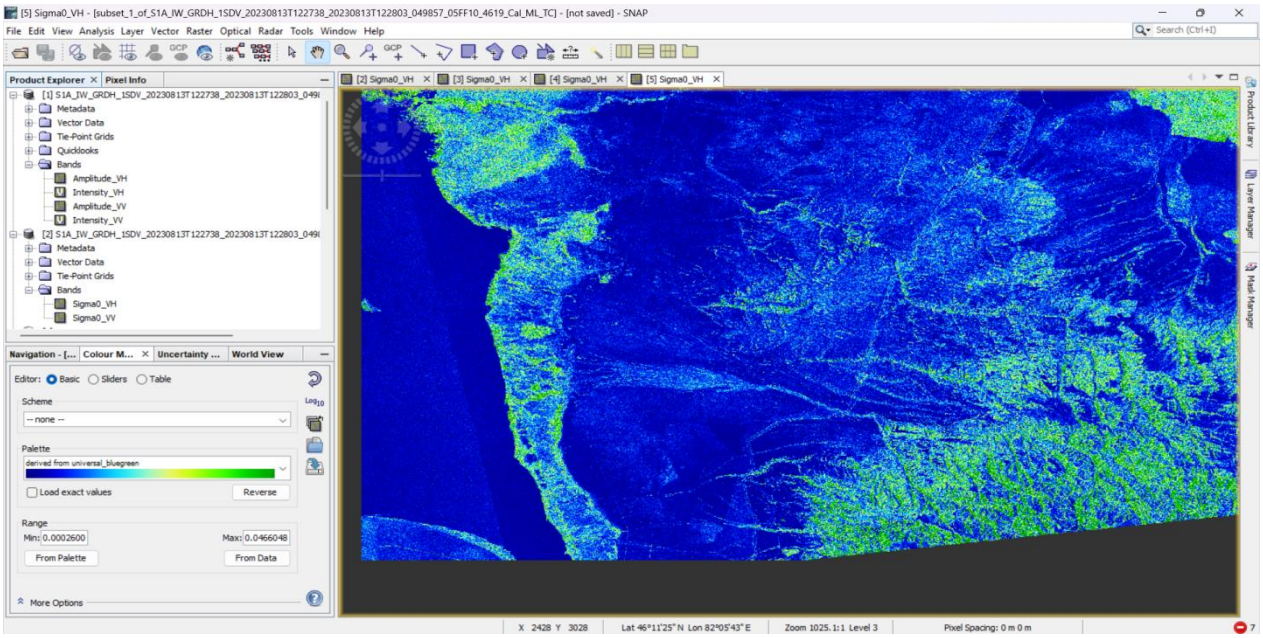


Figure 6. Mask Sigma Note (Sigma O) in the SNAP, January 2024 (Source: Authors' data processing)

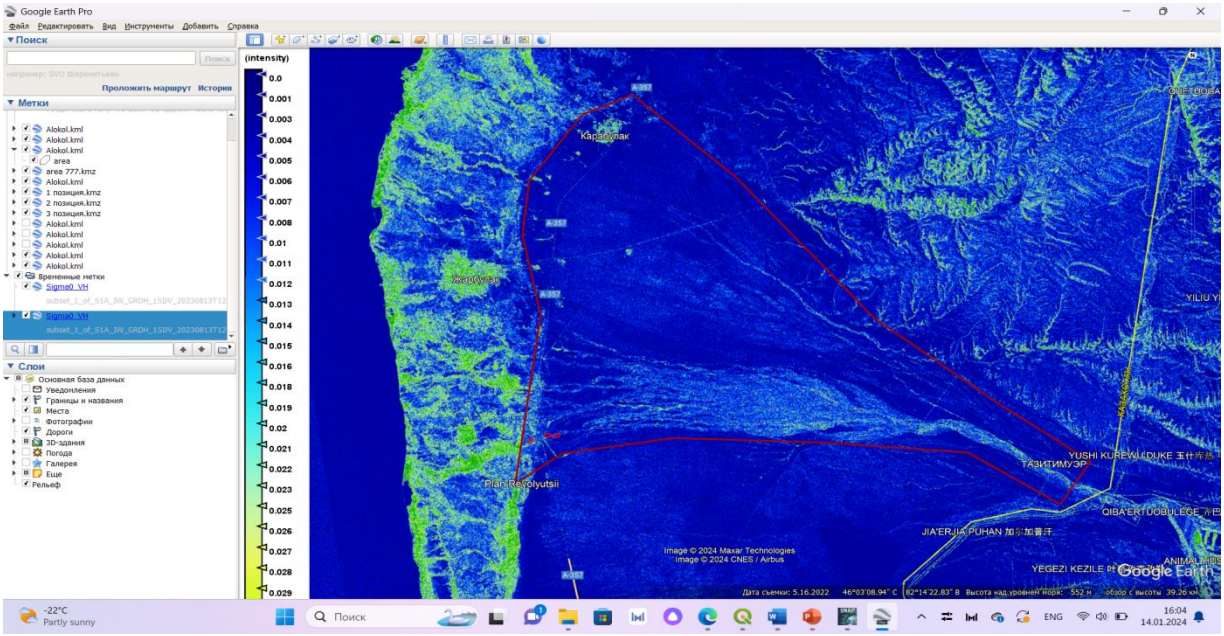


Figure 7. Alluvial Fan of the Tasty River located in the Destination Exported
Sigma Nought (Sigma 0) to Google Earth, January 2024 (Source: Authors' data processing)

In addition, for identifying the factors of Local tourism destinations growing in Kazakhstan, the Landsat 8 Archive Data were browsed in Earth Explorer Web service (https://earthexplorer.usgs.gov), the images were selected for September, the period from 2013 to 2023 years, as this month is the end of the tourist season in this destination.

**The following Landsat 8 Satellite images were used:**

LC08_L1TP_147028_20130925_20200913_02_T1_B8.TIF;
LC08_L1TP_146028_20140921_20200910_02_T1_B8.TIF;
LC08_L1TP_146028_20150924_20200908_02_T1_B8.TIF;
LC08_L1TP_147028_20160917_20200906_02_T1_B8.TIF;

LC08_L1TP_147028_20170920_20200903_02_T1_B8.TIF;
LC08_L1TP_146028_20180916_20200830_02_T1_B8.TIF;
LC08_L1TP_146028_20190919_20200826_02_T1_B8.TIF;
LC08_L1TP_147028_20200912_20200919_02_T1_B8.TIF;
LC08_L1TP_147028_20210915_20210924_02_T1_B8.TIF;
LC08_L1TP_147028_20220918_20220928_02_T1_B8.TIF;
LC08_L1TP_147028_20230921_20230926_02_T1_B8.TIF

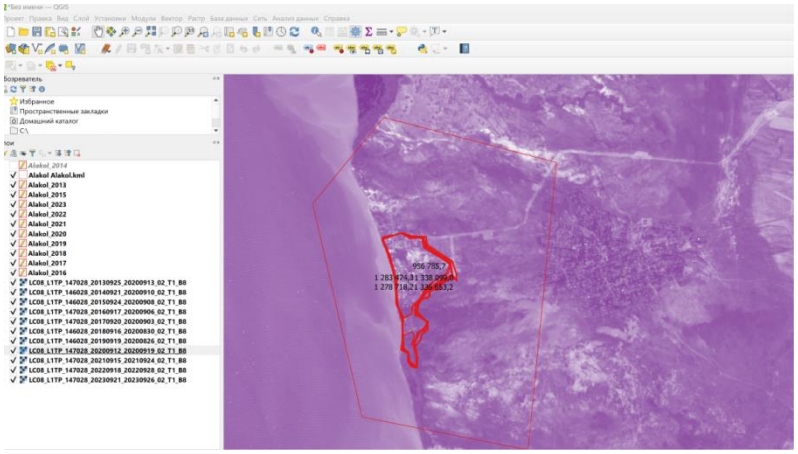

Figure 8. Overlapping analyzes, calculating of the Destination's area by using QGIS (Source: Authors' data processing)

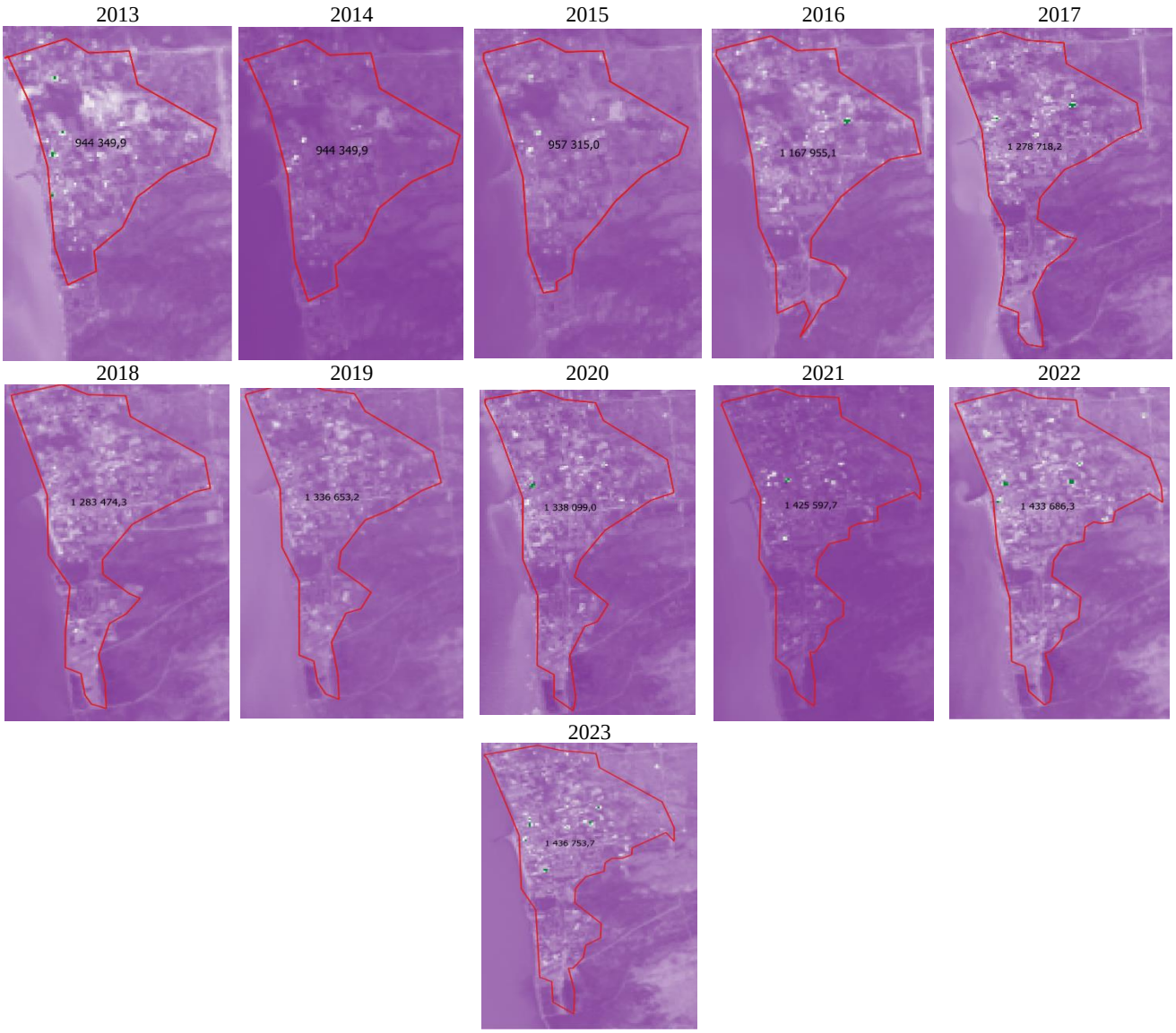


Figure 9. Destination area boundaries (sq. meters) changes for the period from 2013 to 2023 (Source: Authors' data processing)

Further, using the Open-Source Program QGIS vector layers were created and had been done calculation of the Destination's area. The vector data were created for each year from 2013 up to 2023. QGIS uses satellite images from selected layers to analyze spatial data of the studied Destination. The GIS allowed to view area spatial evolution of the Destination, which enabled to create comparative images to analyze the dynamics of the territory development (Figure 8, 9).

**FINDINGS**

**1. Overlapping analyzes, calculating of the Destination's area by using QGIS**

According to Overlapping analyzing (Figure 8) had been calculated and found Destination's area growing from **944** to **1 437 square meters (during 2013-2023)**. In accordance with the results obtained, it is possible to predict the environmental load from the increase of accommodation facilities and the number of tourists. The expansion of the territory of the recreation area requires planning the construction of facilities, sanitary and hygienic services without harming the environment.

**2. Secondary data analyses on Destination's Area, accommodation and visitors' numbers**

Based on official statistical sources for the period of the last 5 years (Bureau for National Statistics, 2019-2023) we are able to review number of visitors served by resort areas during 2019-2023. Residents of Kazakhstan increased their interest on the Destination during and after the COVID-19 pandemic period (NCE "Atameken" news, 2023).

From the Chart given below (Table 3) there was a significant growing number of tourists, which shows the demand for domestic tourism in the territory of the Destination in 2020, 2021. In 2020, according to the resolution of the head of the State Sanitary Doctor of East Kazakhstan region, measures were taken to comply with sanitary and hygienic norms during the stay of tourists, special attention was paid to the occupancy rate that could not exceeding of 50% in places of rest from the design capacity (Vlast.kz, 2020). And it should be noted that recreation on the shores of Lake Alakol in Eastern Kazakhstan in 2020 was allowed only from June 13, despite this number of the visitors reached **40 254** people.

Table 3. Destination statistics for the period from 2019 to 2023 (Eastern part of the Balkhash-Alakol Basin) (Source: Authors' data processing)

| # | Year | Number of accommodations (guest houses) | Number of visitors served in the resort areas by the duration of staying (thousands) | Destination's Area (square meters |
|---|---|---|---|---|
| 1 | 2019 | 167 | 143 480 | 1 336 |
| 2 | 2020 | 172 | 40 254 | 1 338 |
| 3 | 2021 | 194 | 95 908 | 1 426 |
| 4 | 2022 | 214 | 160 954 | 1 434 |
| 5 | 2023 | 220 | 204 277 | 1 437 |

**3. Statistical calculations (multiple regressing) of Domestic and International passenger's number with the comparison the National currency rate to USD**

The airline ticket prices of Kazakhstan also remain expensive for consumers (tourists) and are formed on the basis of market pricing mechanisms, where prices can be maintained, increased and decreased depending on demand, advance purchase of an air ticket, day of the week of the flight, flight departure time (Concept of development of the tourism industry of the Republic of Kazakhstan for 2023 - 2029 year, 28.03.2023, p. 13).

The chart of multiple regressing in Excel 2016 with the Number of passengers Domestic transported as Depended variable Y and International passengers as one of the independent variables (X), and the National currency Tenge rate to USD as another independent variable (Z) (Table 4).

Table 4. Domestic and International passenger's number with the comparison the National currency rate to USD (Source: Authors' data processing) (* National bank.kz)

| Year | Number of passengers transported mln (Domestic) | Number of passengers transported mln (International) | National currency of the Republic of Kazakhstan to USD* | Predicting of regression dependence between factual domestic passengers and predicted with regression of international and USD rate |
|---|---|---|---|---|
| | Y | X | Z | Predicted Y |
| 2013 | 2.12 | 1.56 | 152 | 1.031693801 |
| 2014 | 2.18 | 1.59 | 179 | 1.37482952 |
| 2015 | 2.28 | 1.58 | 222 | 1.856396461 |
| 2016 | 2.09 | 1.66 | 342 | 3.321528595 |
| 2017 | 2.16 | 2.04 | 326 | 3.565058708 |
| 2018 | 2.07 | 2.25 | 345 | 4.018725326 |
| 2019 | 2.81 | 2.3 | 383 | 4.510394755 |
| 2020 | 3.04 | 0.66 | 413 | 3.011807739 |
| 2021 | 5.30 | 1.16 | 426 | 3.722501964 |
| 2022 | 7.00 | 2.9 | 460 | 6.066901951 |
| 2023 | 8.40 | 3.5 | 480 | 6.97016118 |
| | | | | Mean: **38.9%** Error Estimation Rate |

Analyzing the linear multiple regression of international and domestic air passenger transportation in Kazakhstan, incorporating the national current tenge rate to USD over the period of 2013-2023, reveals intriguing insights into the

dynamics of air travel within the country. The study focuses on understanding the relationships between domestic and international passenger numbers, as well as the impact of fluctuations in the tenge rate to the USD dollar on these variables.

The data collected for this analysis spans a decade, providing a comprehensive view of how these factors have interacted over time. By considering domestic passengers as the dependent variable (Y), international passengers as one of the independent variables (X), and the tenge rate to USD as another independent variable (Z), the regression model aims to capture the influence of both local and global factors on air travel in Kazakhstan.

The results of the regression analysis reveal a **38.9%** of error of prediction, indicating a moderate level of explanatory power in the model. This suggests that nearly **60 %** of the variability in domestic air passenger numbers can be explained by the combination of international passenger volumes and fluctuations in the tenge rate to USD. However, it also implies that there are other factors at play which are not accounted for in the current model (Table 5).

Table 5. Domestic and International passenger's number with the comparison the National currency rate to USD (Source: Authors' data processing in Excel 2016)

| **FINDING OF RESULTS** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Regression statistic** | | | | | | | | |
| Multiplicity R | | 0.809595032 | | | | | | |
| R-square | | 0.655444115 | | | | | | |
| Normalized R-square | | 0.569305144 | | | | | | |
| Standard error | | 1.483082984 | | | | | | |
| Surveillance | | 11 | | | | | | |
| **Dispersion analysis** | | | | | | | | |
| | **df** | **SS** | **MS** | **F** | | **Significance F** | | |
| Regression | 2 | 33.47317345 | 16.73658673 | 7.609147246 | | 0.014094143 | | |
| Residual | 8 | 17.59628109 | 2.199535136 | | | | | |
| Total | 10 | 51.06945455 | | | | | | |
| Coefficients | | Standard error | t - Statistics | P - Value | Lower 95% | Upper 95% | Lower 95.0% | Upper 95.0% |
| Y-intersection | -2.462829259 | 1.616284043 | -1.523760177 | 0.166072635 | -6.189986946 | 1.264328428 | -6.189986946 | 1.264328428 |
| The variable X1 | 1.123415692 | 0.645705208 | 1.739827522 | 0.120075851 | -0.365583188 | 2.612414573 | -0.365583188 | 2.612414573 |
| The variable X2 | 0.011460491 | 0.004606915 | 2.487671251 | 0.037658665 | 0.000836925 | 0.022084056 | 0.000836925 | 0.022084056 |
| **OUTPUT** | | | | | | | | |
| **Surveillance** | **Predicted Y** | **Residuals** | **Standard residuals** | **Average approximation error** | | | | |
| 1 | 1.031693801 | 1.088306199 | 0.820428347 | 105.4873256 | | | | |
| 2 | 1.37482952 | 0.80517048 | 0.606984217 | 58.56511437 | | | | |
| 3 | 1.856396461 | 0.423603539 | 0.319336922 | 22.81859226 | | | | |
| 4 | 3.321528595 | -1.231528595 | -0.928397698 | 37.07716372 | | | | |
| 5 | 3.565058708 | -1.405058708 | -1.059214763 | 39.41193744 | | | | |
| 6 | 4.018725326 | -1.948725326 | -1.469062199 | 48.49113009 | | | | |
| 7 | 4.510394755 | -1.700394755 | -1.281856209 | 37 | | | | |
| 8 | 3.011807739 | 0.0281922605272347 | 0.021252961 | 0.936057775 | | | | |
| 9 | 3.722501964 | 1.5774980364 | 1.189209532 | 2.37735939 | | | | |
| 10 | 6.066901951 | 0.933098049 | 0.703423439 | 15.38014058 | | | | |
| 11 | 6. 42983882 97016118 | 1.42983882015419 | 1.07789545 | 20.51371243 | | | | |
| | | | | 38.978 | | | | |

According to Figure 10 (diagram of prediction), the linear multiple regression of International and Domestic air passenger transportation in Kazakhstan, incorporating the national current tenge rate to USD over the period of 2013-2023, blue line is factual rate and orange is predicted with 38.9% of Error of Prediction.

The findings suggest that there is a significant relationship between international and domestic air passenger traffic in Kazakhstan. As international travel increases, it may have a positive spillover effect on domestic air travel, indicating potential synergies between these two segments. Additionally, the impact of the tenge rate to USD on passenger numbers highlights the importance of macroeconomic factors in shaping air travel trends.

Looking ahead, this analysis provides valuable insights for policymakers, airlines, and industry stakeholders to better understand the dynamics of air passenger transportation in Kazakhstan. By considering the interplay between international and domestic travel patterns, as well as external economic factors like currency exchange rates, decision-makers can make more informed choices to promote sustainable growth in the aviation sector. The linear multiple

regression analysis of international and domestic air passenger transportation in Kazakhstan offers a specifically perspective on the complex relationships that drive air travel trends in the country.

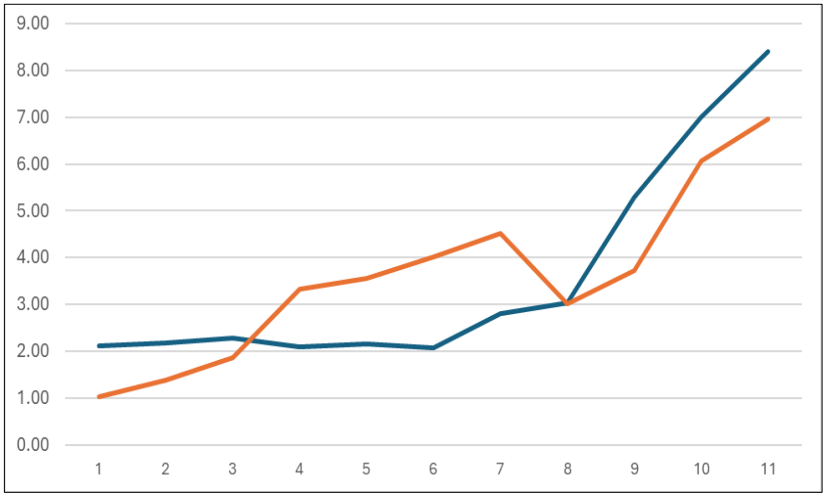


Figure 10. Graph of the linear multiple regression of International and Domestic air passenger transportation in Kazakhstan, incorporating the national current tenge rate to USD over the period of 2013-2023, Blue: Fact Orange: Predicted (Source: Authors' data processing)

By acknowledging the influence of both global and local dynamics, this study contributes to a deeper understanding of the factors shaping the aviation industry and lays the foundation for future research and policy interventions in this critical sector of national tourism in Kazakhstan.

## CONCLUSION AND SOME LIMITATIONS

The study has a meaningful contribution for defining tourism perspectives of the Destination.

First of all, land surface cover of the Destination has not been well observed. And there is a lack of research studies on green and forest cover of the Destination. Secondly, we had done verification visually by radar and optical images by using GIS technology, as well as by field survey methods of land surface cover with a wide homogeneous flatland and the absence of forest cover in the territory of the study Destination. Moreover, overlapping analysis had been calculated and found Destination's area growing to 1 437 square meters. This research finding will be useful for researchers in order to predict the environmental issues from the increase of accommodation facilities and the number of tourists.

And thirdly, the regression analyses of air traffic of domestic and international destinations with the correlation of National currency to USD has been carried out, it shows that regression reveals a 38.9% error of prediction, indicating a moderate level of explanatory power in the model. This suggests that nearly 60 % of the variability in domestic air passenger numbers can be explained by the combination of international passenger volumes and fluctuations in the tenge rate to USD. It should be noted that, mainly Aquatic Ecosystem Services of the Lake Alakol are being provided to tourists of the Destination. In this regard, the shoreline of the lake is eroded every year, there are not provision for green construction of facilities, sufficient greenery with a long-term perspective. The following conclusions can be drawn as a result of the research work. Given the Destination's growth and the variability in domestic, international passenger numbers, it is necessary to create conditions for the development of Alternative Ecosystem Services in the form of specialized green parks, green lanes, and tourist pathways (hiking trails, bicycle trails).

This approach can lead to the creation of green areas and parks that not only provide recreational opportunities but also contribute to the conservation of biodiversity, cultural integrity and the overall well-being of the local community.

In addition, the study identified limitations in collecting secondary data for conducting correlation analysis. For example, there is no database on the population of the nearest village located close to the Destination, there are not annual statistics for the period 2013-2023. And further research could include more recommendations on how Alternative Ecosystem Services can contribute to the sustainability of the Destination.

**Author Contributions:** Conceptualization, R.G., M.K.; methodology, R.G. and M.K.; software, R.G., M.K.; validation, R.G. and M.K.; formal analysis, R.G., M.K.; investigation, R.G. and M.K.; data curation, R.G. and M.K.; writing - original draft preparation, R.G.; writing - review and editing, R.G. and M.K.; visualization, R.G; supervision, M.K. and R.G.; project administration, M.K. All authors have read and agreed to the published version of the manuscript.

**Funding:** Not applicable.

**Institutional Review Board Statement:** Not applicable.

**Informed Consent Statement:** Not applicable.

**Data Availability Statement:** The data presented in this study may be obtained on request from the corresponding author.

**Acknowledgements:** The research undertaken was made possible by the equal scientific involvement of all the authors concerned.

**Conflicts of Interest:** The authors declare no conflict of interest.

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Article history: Received: 10.08.2024 Revised: 27.11.2024 Accepted: 24.12.2024 Available online: 17.01.2025