

# Comparative Analysis Of The Vegetation Cover Of The Goychay District On The Basis Of Remote Sensing.

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## Abstract

Based on satellite images of different years and the vegetation index NDVI, a comparative analysis of vegetation in the Goychay region carried out. Remote sensing methods for studying vegetation and soil ecosystems intensively used in our time. Various vegetation parameters required for research can be obtained using remote sensing satellites. The optical and radiation properties of ecosystems considered in various fields, but the red 0.6–0.7  $\mu\text{m}$  and near-infrared 0.75–1.35  $\mu\text{m}$  channels have proven to be the most valuable for remote sensing of vegetation.

**Key words:** Comparative Analysis, vegetation index, remote sensing

Measured spectral reflectance data commonly used in vegetation indices. The use of satellite images makes it possible to significantly reduce the implementation of ground-based experimental work. Comparison of images of the same areas of ecosystems obtained at multi-year intervals can be used to record and analyze the dynamics of the composition of valuable ecosystem populations [1,2]. The purpose of the study is to conduct a comparative analysis and assessment of the state of vegetation cover using satellite images and the vegetation index of the Goychay region of the Azerbaijan Republic.

NDVI calculations in ArcGIS performed using a raster calculator using preloaded data. The equation for calculation is as follows:

$$\text{NDVI} = \frac{\text{NIR} - \text{RED}}{\text{NIR} + \text{RED}}, \text{ where}$$

NIR – reflection in the near infrared region of the spectrum;

RED – reflection in the red region of the spectrum.

The relationship of these indicators to each other allows us to clearly separate and analyze plant objects from other natural objects. NDVI scale varies from

-1 to 1. Vegetation cover is always positive NDVI values between 0.2 and 1. All numbers above 0.6 indicate maximum green leaf density. [3].

Research results. To analyze the dynamics of vegetation cover, satellite images from different years (2013, 2017, 2022) Landsat 8, 9 were used. Also, for comparative analysis and assessment of the state of vegetation cover in the study area, the ArcGIS 10.6 geographic information system was used. All images underwent radiometric and atmospheric correction. The calculation of NDVI was carried out in Spatial Analyst of the ArcGIS 10.6 program and the stages of processing the satellite image Landsat 8 - 2013, 2017, and Landsat 9 2022 were completed. NDVI were obtained for different years 2013, 2017, 2022 (Fig. 1, 2, 3).

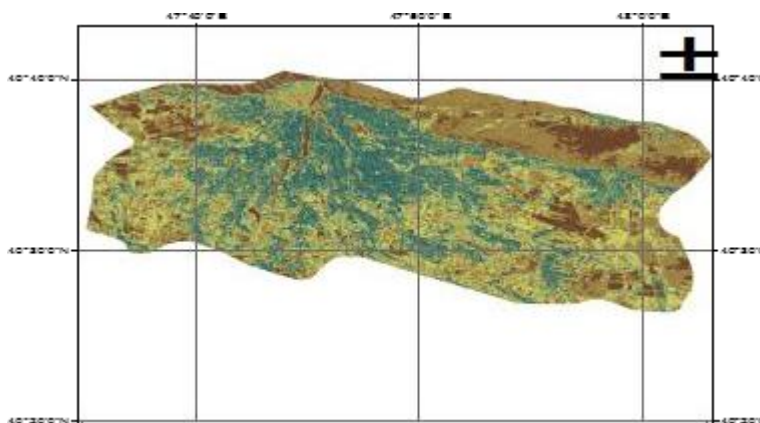


Figure.1 Vegetation index NDVI in 2013 of Goychay region

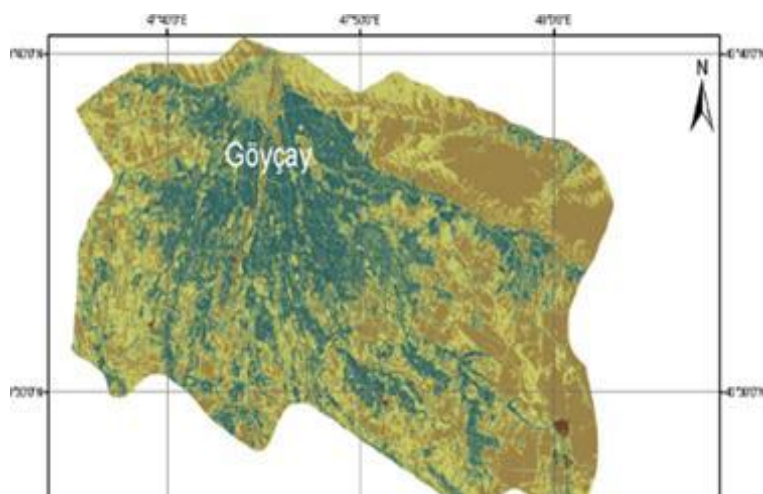


Figure.2. Vegetation index NDVI in 2017 of Goychay region

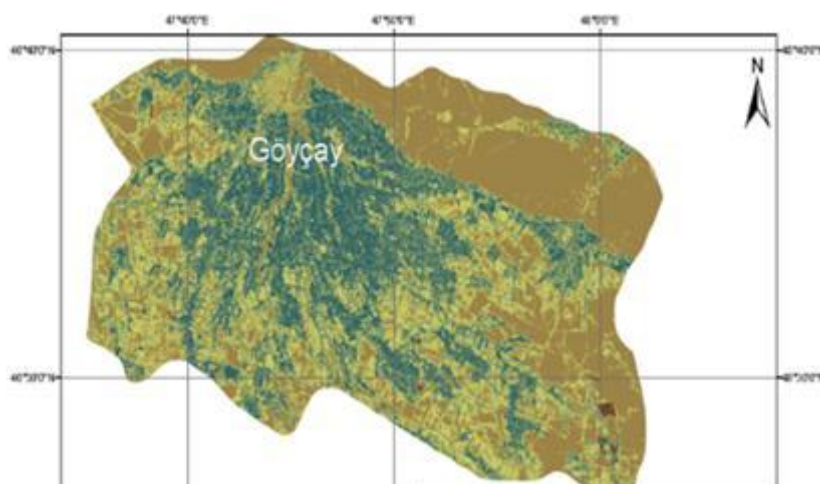


Figure.3. Vegetation index NDVI in 2022 of Goychay region.

Various NDVI ranges were obtained (Table 1). Low and high NDVI values for plant objects were revealed when analyzing Landsat-8,9 images.

Table 1. Comparative analysis based on NDVI in different years 2013, 2017, 2022.

NDVI-2013		
1	- 0,18 -0,13	Water bodies and bare land
2	0,13 – 0,19	Open ground
3	0,19 – 0,27	Sparse vegetation
4	0,27 – 0,35	Bushes
5	0,35 – 0,56	Moderate vegetation
NDVI-2017		
1	-0,24 – 0,03	Water bodies and bare land

2	0,03 – 0,18	Open ground
3	0,18 – 0,25	Sparse vegetation
4	0,25- 0,38	Bushes
5	0,38 – 0,58	Moderate vegetation
<b>NDVI-2022</b>		
1	-0.14 -0,03	Water bodies and bare land
2	0,03 - 0,18	Open ground
3	0,18 - 0,25	Sparse vegetation
4	0,25 - 0,34	Bushes
5	0,34 - 0,55	Moderate vegetation

Based on the obtained NDVI of 2013, an analysis carried out for the vegetation of the Goychay region. Ranges from – 0.188040987 to 0.568458378 were obtained, then ranges from – 0.249702677 to 0.58340472 for NDVI of the study area for 2017 and NDVI for the state according to the Landsat 9 image for 2022 with ranges from – 0.143889219 to 0,555296183. Vegetation NDVI values of 0.56 indicate relatively moderate vegetation in the central part of the area for the period 2013. By 2017, an increase in NDVI of 0.58 indicates that biomass was increasing and there was moderate vegetation. The resulting NDVI map for the state based on the Landsat 9 image for 2022 with ranges from – 0.143889219 to 0.555296183 shows a slight drop in the NDVI index and the presence of more sparse vegetation. For the vegetation of the Goychay region, low positive NDVI values (from approximately 0.20 to 0.40) represent shrubs and meadows and occupied most of the study area. The indicator of healthy, dense vegetation is above 0.5. All numbers above 0.6 indicate maximum green leaf density. For rarer ones, the figure ranges from 0.2 to 0.51.

#### **Conclusion.**

Analysis of the NDVI vegetation index made it possible to assess the state of vegetation cover in different years: 2013, 2017, 2022. The results of the studies show that the use of the NDVI vegetation index allows for the identification and classification of different types of vegetation. Over the years, there have been some changes in the vegetation cover from the range of 0.56, 058 to 0.55 showing a slight drop in the NDVI index and the presence of more sparse vegetation. The vegetation cover of the study area is widespread steppe formation. In the mountainous part there are shrubs - sea buckthorn, oleaster, willow, sumac, here, barnyard grass, pomegranate, rose hips, blackberries.

#### **References**

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