

ANALYSIS OF LAND COVER AND LAND USE INDICATORS OF THE SANGZAR RIVER BASIN

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Abstract: This article analyzes the land cover and land use types of the Sangzor River Basin based on a basin-wide approach. The study uses the QGIS program to identify land cover types in the basin area based on ESA WorldCover 2021 remote sensing data and calculate their area indicators. According to the results, pastures and agricultural lands predominate in the basin area, while forests and water bodies occupy a relatively small share. The location of settlements and sparsely vegetated areas is also analyzed. The results obtained show that the main direction of land use in the Sangzor River Basin is agriculture. The results of the study are important for the rational use of natural resources of the region and the development of environmental protection measures.

Keywords: Sangzor River Basin, basin approach, land cover, land use, QGIS, remote sensing.

Introduction. Currently, the basin approach has become one of the important scientific directions in natural geographical research and is studied as the main object of research in many scientific fields.

The belonging of a river or stream to a watershed determines the general content of nature use and is an important factor in land zoning. The ability to divide the main watershed into smaller natural units allows independent watersheds of tributaries to analyze the diversity of the territory (natural resource supply) and form information support for the land use structure.

In general, since river basins have their own natural boundaries, it is important to zone them, consider them as large and small basin geosystems, and analyze their natural geographical features. Currently, GAT technology programs are widely used to divide river basins into internal geosystems, study and analyze them.

Main part. Land cover and land use indicators of the Sangzor River Basin were processed and analyzed in QGIS based on ESA WorldCover 2021 data (global land cover at 10-meter resolution). During the research, remote sensing data were cut along the basin boundary, thematic types (forests, pastures, croplands, water bodies, bare land, and settlements) were separated, and land use types were analyzed (Figure 1).

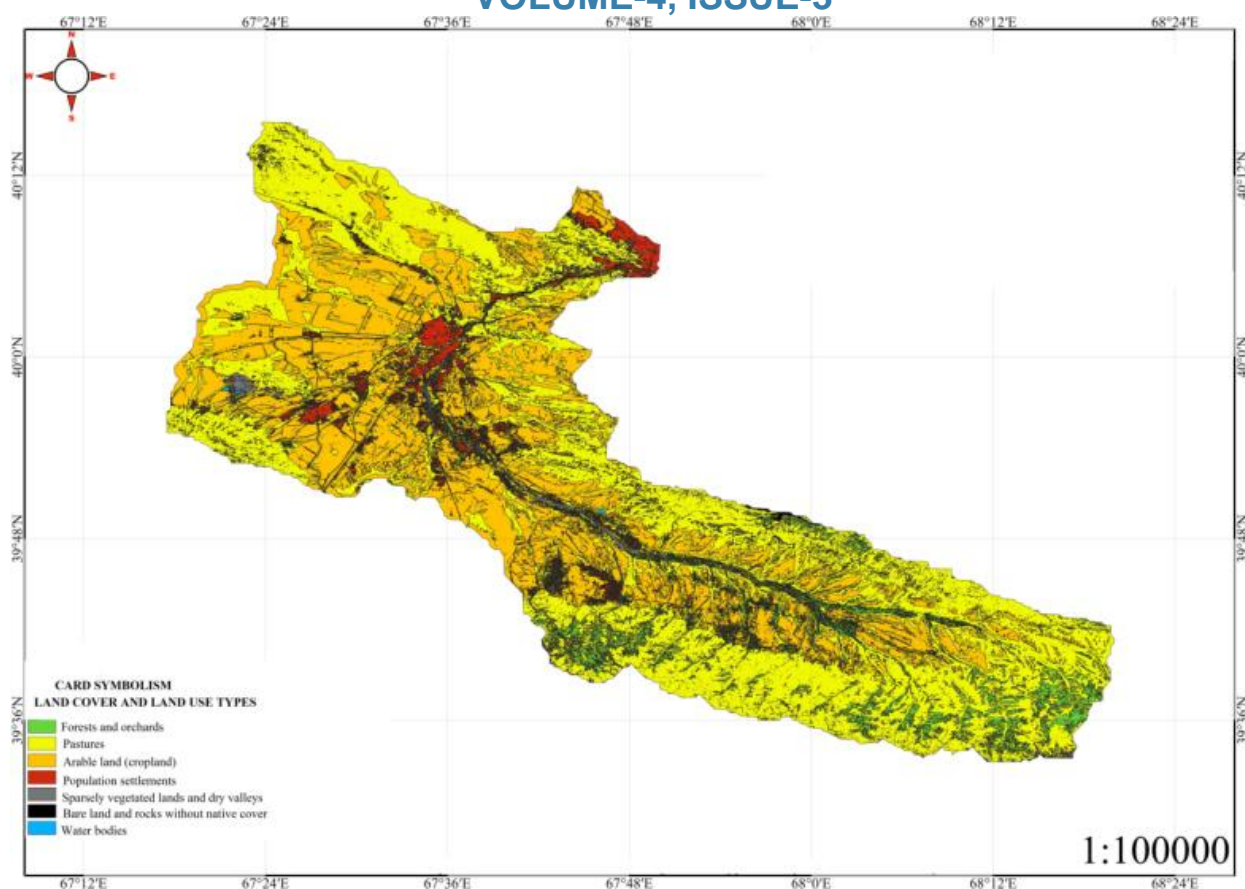


Figure 1. Sangzor River Basin Land Cover and Land Use Types Map

The raster data was vectorized and area indicators were determined for each land cover type. Analysis of the results showed that agricultural lands and pastures predominate in the basin, while forests and water bodies have a relatively small share (Table 1).

Table 1

Land cover and land use indicators of the Sangzor River Basin

№	Land cover and land use types	Area, sq. km.	Share, %
1	Forests and orchards	116,8	4,57
2	Pastures	1432,1	54,86
3	Arable land (cropland)	878,03	33,87
4	Population settlements	90,9	3,55
5	Sparsely vegetated lands and dry valleys	76,4	2,95
6	Bare land and rocks	1,4	0,0568
7	Water bodies	2,6	0,1084
8	Other fields	0,08	0,0032
Total		2598	100

Source: The table was developed by the author using QGIS based on ESA WorldCover 2021 data. The developed map analysis shows that pastures (1432.1 ha) predominate in the basin area, which mainly occupy large areas in the mountainous and foothill regions of Chumqor, Morguzar, Koytash (part of the basin area), Gobdin (part of the basin area). This indicates that the livestock sector of agriculture in the basin area is dominant. In second place are areas occupied by arable land (878.03 km²), such lands are located along the Sangzor river valley and along the bare lands of the rivers and streams. These areas are mainly used for dredging and irrigated agriculture.

Areas occupied by forests and orchards are distributed in the upper parts of the Morguzar and Chumqor mountains and along the banks of constantly flowing rivers. Such areas occupy more than 4.5 percent of the total basin area.

Settlements in the basin are densely located on the terraces of the Sangzor River, in the conical slopes of the streams, in the Galla-Arol basin and in the city of Jizzakh (in the basin). The share of settlements is 3.55%, which indicates a relatively sparse population in this area, but there is an anthropogenic load on land resources.

Land with sparse vegetation and no vegetation cover covers an area of 76.4 km², which indicates the complexity of natural conditions and the risk of land degradation. Such areas include quarries, and the area of water bodies has a small share in the basin.

In general, the results of the analysis show the predominance of agricultural land cover types in the Sangzor River basin and the need to protect natural ecosystems.

Conclusion. The results of the study showed that the analysis of land cover and land use structure in the Sangzor River basin based on a basin approach is important in determining the natural and geographical features of the area. Analysis based on ESA WorldCover 2021 data revealed that pastures and agricultural arable land dominate in the basin. This indicates that the livestock and agriculture sectors play an important role in the economy of the region. The relatively low share of forests, water bodies and other natural landscapes indicates the need to protect natural ecosystems. It was also found that the location of population settlements is mainly associated with the river valley and favorable relief conditions. The results of the study serve as a scientific basis for rational use of land resources, ensuring ecological sustainability and improving territorial planning in the Sangzor River Basin.

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