**Стање и просторни аспеката развоја Полошког региона у Македонији**

**The state and spatial aspects of the development of Polog region in Macedonia**

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**АПСТРАКТ**

Просторно планирање је мултидисциплинарна делатност која обезбеђује планско уређење просторних аспеката развоја. Постоје различитих типова региона, па се према величини деле на мета, макро, мезо и микро регионе. У Македонији је усвојено осам планских региона, међу којима је плански регион Полог, који се састоји од девет општина, заправо зона: Тетово, Гостивар, Маврово и Ростуше, Желино, Теарце, Боговиње, Врапчиште, Јегуновце и Брвеница. Регион се налази у северозападном делу земље и граничи са југозападним и скопским регионом. У овом раду биће размотрени инструменти за планирање туризма, културног и националног богатства, развоја предузетништва, трговине и инвестиција, заштите животне средине и климатских промена, као и проблеме и недостатке развоја Полошког региона са више аспеката.

*Кључне речи: планирање, регион, зоне*

ABSTRACT

Spatial planning is a multidisciplinary activity that ensures the planning regulation of the spatial aspects of development. There are different types of regions, so they are divided into meta, macro, meso and micro regions according to their size. Eight planning regions have been adopted in Macedonia, among which is the Polog planning region, which consists of the following nine municipalities, i.e. zones: Tetovo, Gostivar, Mavrovo and Rostuse, Zelino, Tearce, Bogovinje, Vrapcishte, Jegunovce and Brvenica. The region is located in the northwestern part of the country and is bordered by the southwestern region and the Skopje region. In this paper, the instruments for tourism planning, cultural and national wealth, development of entrepreneurship, trade and investments, environmental protection and climate change, as well as the problems and shortcomings for the development of the Polog region from several aspects will be reviewed.

*Keywords:* *planning, region, zones*

**Introduction**

Space, as a universal category, is an essential determinant of the state and simultaneously subject to the most important process in its development, the planning process. Spatial planning is future planning, an essential characteristic of a civilized society and a reflection of the highest wisdom. Spatial planning ensures balanced spatial development, rational arrangement and use of space, conditions for humane living and work of citizens, as well as the provision of measures for the protection and improvement of the environment and nature, protection from military destruction, natural and technological disasters etc. Polog region is one of the eight regions which will be the subject of analysis in this paper. The total surface area of the region is 2,416 square kilometres or 9.7 percent of the territory of Macedonia. The region has a great natural and man-made wealth. It represents a tourist pearl that abounds with natural beauties, historical-cultural monuments. By applying the traffic planning tool, we will perform zoning of the region and perception of the attributes, shortcomings and proposal of measures for better development.

**Polog region**

This region includes the Polog valley, the Moorish plateau, the Bistra mountain massif and the Radika river valley. The Polog Region consists of 9 (nine) Municipalities, which will also be suitable zones in the zoning procedure. There are 184 settlements in this territory with 304 125 inhabitants. Of the 304,125 citizens, 18.4% are Macedonians, 73.2% Albanians, 5.7% Turks, 1.6% Roma, 0.01% Vlachs, 0.32% Serbs, 0.08% Bosnians and 0.66% are other nationalities.



Figure 1. Location of Polog region

**Traffic routes in the Polog Region**

The region has decent roads and one highway: [Skopje](https://macedonia-timeless.com/eng/cities_and_regions/cities/skopje/)–Tetovo–Gostivar, one railway line Skopje-Tetovo-Gostivar-[Kicevo](https://macedonia-timeless.com/eng/cities_and_regions/cities/kicevo), several cable cars and ski lifts at the ski resorts Popova Shapka and Mavrovo. From this region the roads lead towards the Mavrovo - Debar region and towards Kosovo. There are a number of local routes throughout the region.



Figure 2. Traffic network in the Polog region

**Advantages of Polog region**

**Natural Resources and tourism**

The region has a great natural and man-made wealth. The Polog planning region is rich in mineral resources, which have been found throughout its territory. Of great economic importance are the gray marble deposits in Gostivar and the dolomites in Jegunovce and Čajle. Other present ores and minerals in the region are: manganese, molybdenum, copper, arsenic, lead, chromium and marble. The region does not allow for intensive development of agricultural production, but it is known for products such as Tetovo apple, Tetovo bean, cheese and cheese, which open a perspective for cultivating and promoting the products, which would increase exports. The Polog planning region is a tourist pearl that abounds with natural beauties, historical-cultural monuments. Tourism as an economic branch is not sufficiently developed in the Polog planning region, but there is a large number of unused potentials that represent an opportunity for investments, and with their utilization, they can make the region one of the largest tourist destinations both in the country and in Europe. The already existing ski centers "Mavrovo" and "Popova Shapka" offer an opportunity to upgrade the development of ski tourism and the opportunity to promote and visit the other natural beauties that this region possesses. Many touristic, sports and recreational activities such as skiing, hiking, mountaineering, paragliding, cycling, hunting, fishing, etc. are actively taking place at both centers. Several cable cars and ski fields are concentrated here, then two larger weekend settlements, as well as the largest number of accommodation facilities and representative catering establishments in the Region. The region is full of springs and hot springs. The most notable are the upper course of the Vardar River to the Dervenska Klisura, the picturesque valley of the Pena River, Lakavica and many mountain rivers.



Figure 3. Tetovo apple and Shar Planina

**Natural and cultural-historical heritage in the Polog Region and economic characteristics**

From the cultural and historical heritage in the Polog region, according to their tourist potential, especially distinguished are the: cultural-historical monuments in Tetovo, the monastery St. Athanasij or the Lesok Monastery (1335), Sharena Dzamija (the Painted Mosque) (1495), the Arababati Baba Tekhe (XVIII), the Tetovo Kale, the cathedral church of St. Cyril and Methodius, the church Bogorodica (Holy Mother of God), the monastery St. Naum on Popova Shapka, the church of St. Nikola. In the valley of the river Radika is the famous monastery St. Jovan Bigorski (XVI).

Wholesale trade and retail trade and repair of motor vehicles and motorcycles is the sector of activity that is most represented in the Polog planning region, with a total of 1,611 registered business entities and a 22 percent participation in the total economy. The second sector is the processing industry with a total of 905 registered business entities and 12.4 percent economic participation and construction as a sector with 651 business entities and 8.9 percent participation. With these data, the most important economic sectors are selected, such as production of building materials, processing and production of final wood products, food industry, processing of plastic tables, processing of aluminium and production of textile products.



Figure 4. Lesok Monastery and St. Jovan Bigorski

**Negative characteristics**

**Problems with the infrastructure**

In the Polog region, there are many places where there is a lack of infrastructural coverage of the population, a dirt road or lack of construction in general, and this leads to poor accessibility. The condition of some of the regional road routes is not in accordance, not only with the requirements for economic development, but also with the standards for safe traffic. In the Polog planning region, the local road network is in a bad condition. It is necessary to emphasize that even those funds that are available are not used for the maintenance of local roads, but the construction of new sections is forced and the streets in the urban centers are mostly maintained. The railway network in the Polog region has a slightly lower density if any compared to the average density in Macedonia. The services that are offered in the railway transport are of low quality. The problems that occur with this type of transport are outdated vehicle fleet, low speed of transport and inadequate infrastructure maintenance.

**Problems with illegal landfills and waste**

In the Polog Planning Region, solid waste is managed by the local municipal public enterprises. Waste management is reduced to its collection, transport, and disposal, and only a very small part of the municipal waste is selected. The disposal of solid municipal waste in this region is carried out in the local so-called municipal landfills, which do not meet even the basic sanitary requirements. technical standards for safe disposal of waste. The city of Tetovo has no landfill and is facing the problem of waste disposal. The Rusino landfill, which is located near Gostivar, has been designated as a regional landfill. This landfill does not even meet minimum standards for waste disposal. On the territory of the Polog region there are many so-called illegal landfills, especially in the rural part that is not covered by the service for picking up and depositing garbage.

**Аir pollution**

The air quality in the Polog planning region is good with the exception of the city of Tetovo, where there are certain increases in the concentration of polluting elements, mainly PM particles. (35 days is the maximum allowed). Pollution in Tetovo is also affected by the presence of HEK "Yugochrom" and the use of fuels containing a large amount of sulphur during the winter. About 257,865,600 m3 of CO2 are emitted annually from the energy plants in the Polog Valley. About 2/3 of this amount is thrown out during the heating season and is due to the large consumption of energy for heating, and this is 49% for coal and 34% for wood. Fuel oil accounts for about 10%, while the "Yugochrom" companies realize about 56% of the total emission.

**Zoning of the Polog region**

The zones are the source and destination of travel in the transport network. They and the transport network are connected through connectors. We have established 9 traffic zones in the interior and 3 exterior zones for the Polog region. So, there are 12 zones in total for the Polog region. Each municipality represents a zone in the software tool for planning and forecasting.

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Figure 5. Zoning of Polog Region with software PTV VISUM

**Zoning of the municipalities of Mavrovo and Rostuse, Gostivar and Vrapchiste**

The national park in western Macedonia is in Mavrovo, which covers an area of 73,088 hectares and is the largest among the three national parks in Macedonia. On the territory of the Gostivar municipality, the largest Macedonian river, Vardar, originates. The city abounds in rich nature, favorable geographical position, over 500 m above sea level. It is a real treasure for agricultural production that is used abundantly. The municipality of Vrapcishta is located between the cities of Tetovo and Gostivar, in the valley of Shar Planina, in the northwestern part of the Republic of North Macedonia, which includes a large part of the Polog field. It borders the municipalities of Bogovinje, Bervenica, Gostivar, and the Republic of Kosovo to the west. As a rural environment, about 192 km², with 28,100 inhabitants. The municipality of Vrapčishte is a multi-ethnic environment in which Albanians, Turks, Macedonians and members of other nationalities live.

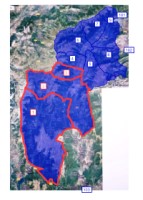
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Figure 6. Zoning of the municipalities of Mavrovo and Rostuse, Gostivar and Vrapchiste

**Zoning of the municipalities of Bogovinje, Brvenica and Tetovo**

Municipality of Bogovinje is a municipality located in the western part of North Macedonia and is located in the Polog region. The center of the municipality is located in the village of Bogovinje, which is also the name of the municipality. Brvenica is a municipality in the northwestern part of North Macedonia. Brvenica is also the name of the village where the municipal seat is found. Brvenica Municipality is part of the Polog Statistical Region. Tetovo is a city in the northwestern part of North Macedonia, built on the foothills of Shar Mountain and divided by the Pena River. The municipality of Tetovo covers an area of 1,080 km² at 468 meters above sea level, with a population of 63,176. The city of Tetovo is the seat of Tetovo Municipality.

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Figure 7. Zoning of the municipalities of Bogovinje, Brvenica and Tetovo

**Zoning of the municipalities of Tearce, Zelino and Jegunovce**

There are 13 settlements in the municipality of Tearce, four villages are hilly and mountainous, and the rest are located in the valley part of the municipality. Jegunovce is one of the larger villages in the Polog Valley, North Macedonia. It is located about 10 mi northeast of the Macedonian city of Tetovo. Želino is a village and seat of the municipality of Želino, North Macedonia.

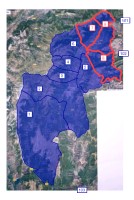


Figure 8. Zoning of municipalities of Tearce, Zelino and Jegunovce

**Attributes of the Polog region**

Data collection was performed for each zone/municipality for a total of 16 attributes given in the following figure. As part of the included attributes, the following can be listed: number of residents, employees in health, education, recreation, shopping, etc.

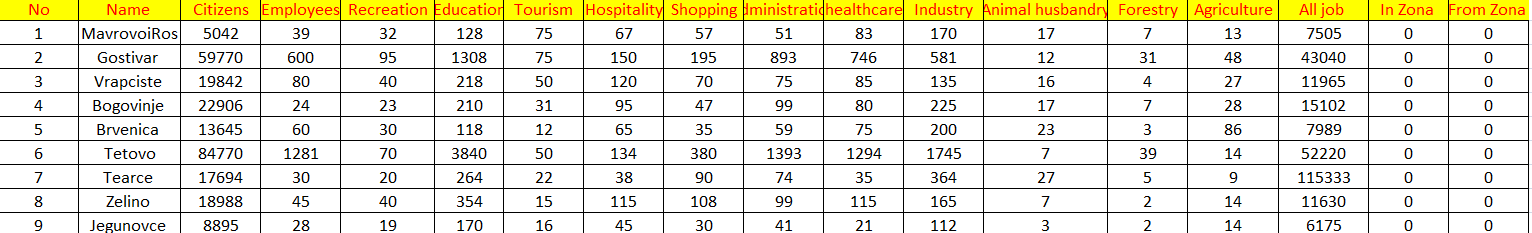
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Figure 9. Attributes of the Polog Region

**Planning the development of the Polog planning region**

* A region with a developed infrastructure and created partnership relations for fast sustainable urban and rural development with modern tourism facilities, where are they multicultural values are nurtured, and natural values are optimally used treasures of Shar Mountain.
* Support and development of entrepreneurship, competitiveness, and the innovation of Micro, Small and Medium-sized Enterprises.
* Support and development of modern education, development of human capacities and increasing the level of social development.
* Sustainable development of sports-recreational centres in the region through valorisation of the natural and cultural values.
* Protection of the environment through the controlled use and management of natural resources.
* Urban plans for inhabited and non-inhabited places and spatial planning.
* Modernization of the existing "A" road network and construction of new sections.
* Modernization of the existing ones and construction of new regional ones roads.
* Modernization of the existing and building of new local roads.
* Reconstruction of existing railway infrastructure.
* Increasing railway crossing safety lines with roads.
* Creation of regional spatial plan.
* Updating and development of General Urban Plans (GUP).
* Update and development of Detailed Urban Plans (DUP).
* Preparation of planning documentation for rural settlements.
* Determining suitable places in PD where the separate fractions of generated waste will be temporarily stored, until they are handed over to an authorized company.
* Selection of all fractions of waste generated in the home, up to their delivery to an authorized company. Waste will be stored in a way that prevents access to animals and their dispersal.

**Conclusion**

In this paper, the subject of analysis was the Polog region, it is one of the eight planned regions in the Republic of Macedonia. Polog region covers the northwestern part of the state. It has a rich hydrographic network, partially used by hydroelectric power plants on the Mavrovo Lake. The vegetational characteristics of the region and the surrounding mountains create a prerequisite for the development of agriculture, and especially animal husbandry. The high mountain terrains, relief, and climate allow this region to be the most famous tourist and recreational center. The region has a road and railway network, but measures are needed for their rehabilitation, completion, and modernization, because the roads are a link between the region and the possibility of future progress. It has many churches and monasteries, which increases the possibility of traveling for recreation and tourism. Unfortunately, like all of them, this region also faces a large number of problems from different aspects, lack of infrastructure, isolation of certain places from the main centres, waste water, illegal dumps, air pollution from industry, noise and vibrations. The zoning is done on all 9 municipalities that are part of the region and we can see the defined attributes. Spatial planning is important for the sustainability, development, and future of the area under consideration, and is possible by introducing various goals and instruments, measures.

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