

Natural resources for the nature-based tourism development of the Vojvodina Province

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Abstract: The area of the Autonomous Province of Vojvodina has significant natural potentials for the development of nature-based tourism. The paper analyzes the data found in various articles as well as data obtained hands-on. Selected factors such as location, relief, climate, hydrography, flora and fauna and protected areas of Vojvodina were analyzed. The degree of presence of the mentioned factors for the development of nature-based tourism was determined with selected indicators. The medium and high level of the presence of factors indicates the possibility of developing ecotourism, scientific tourism, hunting, fishing, sports and recreation, bird watching, nautical, trips and other forms of tourism based on natural resources. Quantitative, comparative and data presentation methods were used in the research. The results of research can aid further research of nature-based tourism.

Keywords: nature-based tourism, AP Vojvodina, ecotourism, natural resources

JEL classification: Z32, Q56, Q57

Prirodni resursi za razvoj turizma baziranog na prirodi Vojvodine

Sažetak: Prostor Autonomne pokrajine Vojvodine poseduje značajne prirodne potencijale za razvoj turizma baziranog na prirodi. U radu su analizirani podaci različitih pisanih dokumenata, kao i podaci dobijeni na terenu. Ispitivani su odabrani faktori kao što su: položaj, reljef, klima, hidrografija, biljni i životinjski svet i zaštićena područja Vojvodine. Stepenn prisutnosti navedenih faktora za razvoj turizma utemeljenog na prirodi, utvrđen je uz pomoć odabranih indikatora. Srednji i visok nivo prisutnosti faktora ukazuje na mogućnost razvoja ekoturizma, naučno-istraživačkog, lovnog, ribolovnog, sportsko-rekreativnog, turizma posmatranja ptica, nautičkog, izletničkog i drugih formi turizma utemeljenih na prirodnim resursima. To je ujedno cilj ovog rada. U istraživanju su korišćene kvantitativna, komparativna i metoda prikaza podataka. Rezultati istraživanja mogu pomoći daljem istraživanju turizma utemeljenog na prirodi.

Ključne reči: turizam prirodnih resursa, AP Vojvodina, ekoturizam, prirodni resursi

JEL klasifikacija: Z32, Q56, Q57

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1. Introduction

The paper focuses on the protected areas of Vojvodina and natural resources that are important for the development of nature-based tourism. The area of the Autonomous Province of Vojvodina is characterized by diverse natural resources for the development of various forms of tourism. The tourism form that protects and promotes natural values is nature-based tourism (Kostić et al., 2019). Nature-based tourism often refers to protected natural areas. The territory of Vojvodina covers 135 natural sites, the total area of which is 141,044.65 ha (Delić et al., 2017). This makes 6.56% of the total area of Vojvodina. The relatively small amount of protected areas can be a starting point for the development of nature-based tourism. Nature-based tourism development would also condition the growth of protected areas (Job et al., 2017).

The Autonomous Province of Vojvodina has significant potentials for all forms of nature-based tourism development. Diverse relief features, favorable climate, many hydrographic, diverse and rare flora and fauna, and protected natural areas are all different significant natural potentials for the tourism development (Maksin et al., 2018). Natural-geographical features mostly form the complete life of a certain area. These conditions decide the role of each species in the systemic symbiosis where the human role is important. All human activities are closely related to the basic characteristics of the area in which the movement of tourists is realized. Changing certain elements of the environment directly affects the behavior and characteristics of species and the complete nature (Batman & Demirel, 2016). Therefore, the geographical place of a certain area, relief and soil composition, climate, hydrography and biogeography, are the basic preconditions for the formation of the main features of Vojvodina, and can have a positive impact on the nature-based tourism development.

The area of Vojvodina has different ecosystems inhabited by many species. The protection of areas from external impact and user pressures can be realized through nature-based tourism. The development of tourism must take into account all the natural and geographical characteristics of the area in which it develops.

The goal of this paper is to research and analyze the natural resource base of protected areas of Vojvodina. That includes data found in various articles as well as data obtained hands-on such as location, relief, climate, hydrography, flora and fauna. The presence of certain natural factors will determine the selected indicators (Maksin et al., 2011).

The contribution to scientific research is reflected in the use of the results obtained in this research in the development of a strategy for nature-based tourism in Vojvodina. The paper centers on the natural factors of AP Vojvodina, which can have high importance for the development of nature-based tourism and sustainable tourism development.

The method of this paper includes the quantitative research method. The paper research method analyzes various written data about selected indicators of sustainability in protected natural areas of Vojvodina. After the analysis, with the comparative method, the most important factors that positively impact the development of tourism can be singled out.

2. Background

A feature of 21st-century tourism is the protection and improvement of nature (Bello et al., 2016). Tourists are increasingly choosing sustainable tourist destinations (Wardle et al., 2018). The reason is the wish of tourists for natural values to remain in the future. Nature-based tourism is a form of tourism that uses natural values (Eagles, 2014). Those are

ecotourism, scientific-tourism, bird and animal watching, adventure tourism, sports tourism, trips, etc. (Štetić & Trišić, 2018).

Vojvodina completely belongs to the Pannonian biogeographical region and represents a secondary forest-steppe area. Forests and wooded areas cover 6.8% of the territory. Natural specifics such as favorable climate, relief, flora and fauna, the richness of water resources, and protected areas, place this region in the highly promising areas for the development of nature-based tourism (Trišić et al., 2020; Torres-Delgado & Saarinen, 2014; Valdivieso et al., 2015).

There are preserved natural and landscape areas, unique to this part of Europe, such as Deliblato Sands, Fruška Gora, and Vršac Mountains. The floodplains of the Danube, Sava, Tisa, Begej, Tamiš, Karaš, Nera, and Bosut River have been preserved on the lowest terrains, which represent a kind of oasis of flora and fauna, and most of them are in protection regimes precisely because of biological diversity (Noakes & Bouvier, 2013). There are also large steppe areas in central and northern Banat, as well as loess-soil complexes along the Tisa and Danube River. Special mention should be made of the preserved salt marshes of Banat and the unique and specific habitats of salt lakes, which have priority in protection at the international and national levels. In AP Vojvodina, there is a significant network of protected areas, i.e. important centers of autochthonous biological diversity.

Due to this richness of different habitat types, the area of Vojvodina is characterized by a rich and specific species and ecosystem diversity. The characteristic of flora and fauna are the existence of endemic and endangered species. This is a basic condition for the development of nature-based tourism. This form of tourism aims to improve the value of the area (Buclet & Lazarević, 2015).

The Autonomous Province of Vojvodina is situated in a very favorable geographical and tourism setting, which is reflected in the vicinity of neighboring countries and cities, a favorable hydrographic connection with many countries via the Danube, Sava, and Tisa as the most important rivers in Vojvodina (Lazić et al., 2008). This is another important condition for the development of nature-based tourism (Torres-Delgado & Saarinen, 2014).

The development of nature-based tourism in AP Vojvodina can provide great economic benefits, both for the tourism destination and for the economy of AP Vojvodina. Economic revenues have a significant impact on the country's financial system (Leković, 2019).

3. Materials and methods

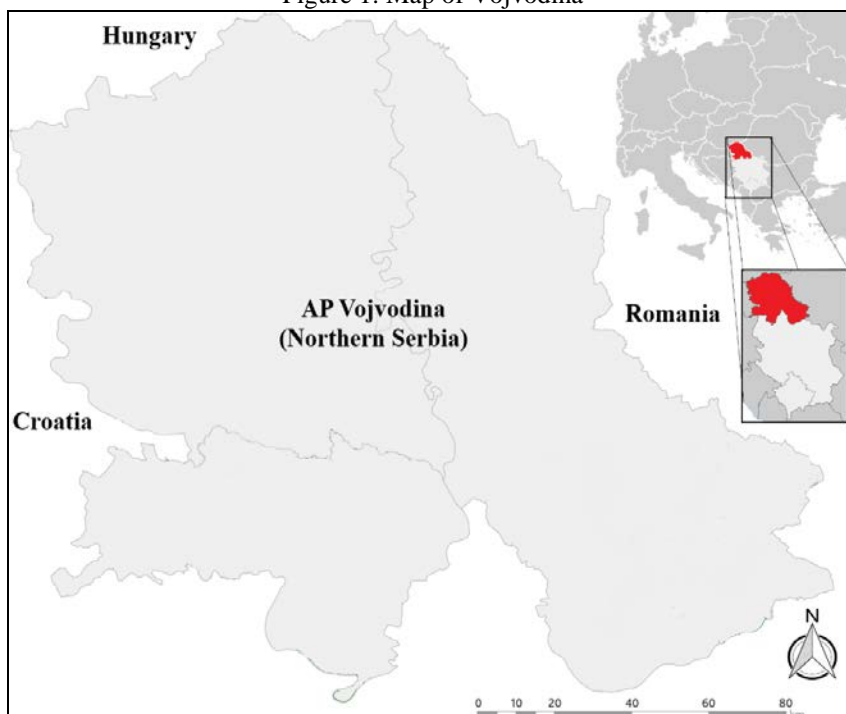
3.1. Study area

The Autonomous Province of Vojvodina is situated in the southern part of the Pannonian Plain, in Northern Serbia. It covers an area of 21,506 km², it is 24.3% of the total territory of the Republic of Serbia (including Kosovo). The area of the Province is located between 44°38' and 46°10' N, and from 18°10' to 21°15' E (Lazić et al., 2008).

Srem, Banat and Bačka are three geographical units of Vojvodina. The area of AP Vojvodina is a territorial and geographical unit that borders the Republic of Hungary to the north, Romania to the east, the Republic of Croatia to the west, the Republic of Bosnia and Herzegovina to the southwest (Figure 1). The southern border of Vojvodina is the administrative border with Central Serbia withal. The natural border of AP Vojvodina consists of the international navigable rivers the Danube towards the Republic of Croatia and central Serbia, and the Sava towards Bosnia and Herzegovina and central Serbia.

Vojvodina has a favorable geographical and traffic location. The proximity of Belgrade and other European cities from the region is an important feature of the tourism development of Vojvodina.

Figure 1: Map of Vojvodina



Source: Author digitalized

3.2. Natural resources data

The following main morphological units can be singled out in the relief of Vojvodina: mountains, sands, and alluvial plains. Mountain areas are Fruška Gora (539 m) and Vršac Mountain (641 m). Fruška Gora covers the southern and southwestern parts of Vojvodina, in the northern part of Srem, while the Vršac Mountains are located in the southeast of Vojvodina and Banat (Lazić et al., 2008). The area of the province consists of very rare biogeographical units, important for the formation of a unique ecosystem. Certain environmental conditions and natural processes have formed very specific terrains, many of which date from the early periods of soil formation. Most of them have special features, characteristic only for this area. Therefore, it should be considered important in the formation of this unique ecosystem. The rivers Danube, Tisa, Sava, Tamiš, Zlatica, and Begej have the largest alluvial plains in Vojvodina (Tomić et al., 2004).

The climate of Vojvodina is moderately continental with certain specifics. The average annual temperature is about 11 °C. Summer temperatures are between 21° C and 23° C and winter around -2° C. However, temperatures can be extreme to the extent that that the difference between the highest and lowest temperatures amounts to over 70° C. The average annual amount of precipitation in Vojvodina ranges from 550 to 600 mm/m², where extremely rainy periods at the beginning of summer (June) and periods without or with a small amount of precipitation (October and March) can be distinguished (Malinović-Milićević et al., 2018).

The river networks of AP Vojvodina consist of three large rivers: the Danube, Sava, and Tisa, with all their tributaries and canals. The Danube, which flows through Serbia with a length of 588 kilometers and through Vojvodina with a length of 358 km, is navigable along the whole length (Štetić et al., 2014). Also, important are the Danube tributaries the Tisa (168 km), the Sava (206 km) and the Begej (75 km), between which a branched network of irrigation, drainage and transport canals were dug, with a total length of 939 km, of which 673 km are navigable. All rivers are characterized by a small fall, slow and winding course, high accumulative power and a tendency to create marshes and meanders, which gives great convenience for the formation of wetlands important for the flora and fauna (Tomić et al., 2004). The hydrographic network also includes lakes, the most important of which are Palić Lake near Subotica (5,8 km²), Ludaš Lake, and other lakes in Fruška Gora and Bačka. Wetlands are protected by special protection regimes, to preserve the unique habitats (Mitsch et al., 2015). Wetlands are highly productive ecosystems that produce wilder species and primary plants, both in number and diversity, more than any other habitat on Earth (Holden, 2016).

Flora and fauna represent a significant natural potential for the development of nature tourism. Species protection forms areas that are suitable for nature-based tourism development. There are over 2,000 species of plants and animals in the province (Stojnić et al., 2015). Biological diversity on the territory of AP Vojvodina and the number of individual species can be shown in Table 1.

Table 1: The overview of the diversity of selected species

Total species	AP Vojvodina	Republic of Serbia
Vascular plants	2,000	3,562
Fishes	75	100
Amphibians	17	23
Reptiles	14	24
Breeding birds	193	237
Mammals	75	98

Source: Author, based on Stojnić et al., 2015

Many species have the endangered status. In the category of Critically Endangered (CR), 28 species and subspecies were recorded. To this group of taxa some extremely rare species should be added that have recently been recorded only in Vojvodina, such as *Elatine hungarica*, *Cerastium subtetrandrum* and *Hierochloe repens*. In the category of Endangered (EN), 50 species were recorded, and in the category of Vulnerable (VU), 40 species were recorded. Other species (82), due to the lack of data needed to assess the exact endangered category, fall into combined categories. In App. I, strictly protected plant species, 1992 and 1999 rev., Appendix 1/Annexe 1, 16 species with four subspecies are listed. On the CITES List - Convention on International Trade in Endangered Species of Wild Fauna and Flora, Appendix 2, 46 species and subspecies are listed (Report on the implementation of the program for the natural resources protection for 2017, 2018).

The area of AP Vojvodina is inhabited by 75 species of mammals, classified in six orders: *Insectivora*, *Chiroptera*, *Rodentia*, *Lagomorpha*, *Carnivora* and *Artiodactyla* are 76.5% of the total number of mammals (98) in the Republic of Serbia (Code on the declaration and protection of strictly protected and protected wild species of plants, animals and fungi (Official Gazette of RS, no. 5/2010, 47/2011, 32/2016 and 98/2016). It should be noted that the Wild Cat (*Felis silvestris*) is a strictly protected species only in the territory of Vojvodina, while the Wolf (*Canis lupus*) has the status of a strictly protected species in this territory, except in the hunting grounds of Deliblato Sands and Vršac Mountains, where it is

protected as a protected wild species. Important representatives of endangered fauna are Eurasian Otter (*Lutra lutra*), Eurasian Beaver (*Castor fiber*) and Wild Cat (*Felis silvestris*). There are three allochthonous species: Fallow Deer (*Dama dama*), White-tailed Deer (*Odocoileus virginianus*) and Mouflon (*Ovis orientalis*), which were introduced in the middle of the last century in some fenced hunting grounds (Karadorđevo and Subotica woods) to increase game (Delić et al., 2017).

Out of the total of 307 strictly protected bird species in Serbia, 283 species have been registered in Vojvodina. Among the most endangered, globally and regionally breeding birds of Vojvodina are Great Bustard (*Otis tarda*) (BirdLife International, 2017a; Martin et al., 2000), White-tailed Eagle (*Haliaeetus albicilla*) (Korsman et al., 2012), Imperial Eagle (*Aquila heliaca*) (BirdLife International, 2017b), and Saker Falcon (*Falco cherrug*).

Out of 24 species of reptiles that live on the territory of Serbia, the area of Vojvodina is inhabited by 16 species. Of that number, 10 species are strictly protected, while two are protected (Stojnić et al., 2015).

With 21 registered amphibian species, Serbia ranks second among the Balkan countries in terms of batrachofauna, just behind Greece, which has 22 registered species. In Serbia, there are 25% of the species of the known 85 species, which inhabit the whole of Europe. Of that number, the area of Vojvodina is inhabited by 16 species, of which 13 are strictly protected, and three species have the status of protected.

About 75 species of freshwater fish from 17 families were recorded in watercourses and stagnant waters on the territory of AP Vojvodina. Out of 30 strictly protected fish species and 34 protected fish species in Serbia, 17 strictly protected and 28 protected fish species were recorded in the area of Vojvodina (Stojnić et al., 2015). European Mudminnow (*Umbra krameri*), is the most important protected fish, and the only representative specie of the Umridae family in Europe, and endemic to the Danube Basin (Freyhof, 2013). According to the IUCN Red List of Threatened Species, European Mudminnow has the status of a vulnerable species - Vulnerable A2c. At the national level, it has the status of a critically endangered species (CR) and is in imminent danger of extinction. There are other strictly protected species of fish: Sunbleak (*Leucaspis delineatus*), Tench (*Tinca tinca*), Amur Bitterling (*Rhodeus sericeus*), and Balkan Loach (*Cobitis elongata*). Protected species are also present in the inland waters of Vojvodina: Common Bream (*Abramis brama*), Blue Bream (*Ballerus ballerus*), Asp (*Leuciscus aspius*), Common Barbel (*Barbus barbus*), Carp (*Cyprinus carpio*), Ide (*Leuciscus idus*), Burbot (*Lota lota*), Pike (*Esox lucius*), Zander (*Sander lucioperca*), and European Perch (*Perca fluviatilis*) (Stojnić et al., 2015).

3.3. Methods

The quantitative research method included an analysis of natural resources that are important for the development of nature-based tourism. A total of 34 indicators representing natural factors important for the development of nature-based tourism were examined (EU, 2013; Konu & Kajala, 2012; Maksin et al., 2011; WTO, 2004). The indicators were confirmed by inspecting various written documents and partially confirmed in the field. The scores of the examined indicators are Low (L), Medium (M) and High (H). The obtained results can represent a significant basis for determining the possibility of developing nature-based tourism (Maksin et al., 2011; Puzović et al., 2015). After the presentation of the selected natural base, unified comparative analysis of these selected indicators will be performed. The comparative analysis will provide significant answers to the extent to which the natural base is important for the development of nature-based tourism (Torres-Delgado & Saarinen, 2014).

4. Results and discussion

Table 2 presents selected indicators that represent the existence of certain factors relevant to nature-based tourism forms (Maksin et al., 2011).

Table 2: Analysis of selected indicators for the development of nature-based tourism

Indicators		Results
1.	The favorable location of AP Vojvodina	H
2.	Favorable relief	H
3.	Favorable climate	H
4.	Hydrographic objects and wetlands	H
5.	Different species of plants and animals	H
6.	Endemic species	M
7.	Endangered species according to IUCN	L
8.	Species reintroduction	L
9.	Protected areas	M
10.	National area protection status	M
11.	International area protection status	L
12.	Sufficient number of supporting tourism facilities	M
13.	Accommodation service	L
14.	Available visitor center	M
15.	Marked walking and educational trails	M
16.	Developed ecotourism	L
17.	Developed scientific tourism	M
18.	Developed photographing birds and animals	M
19.	Developed bird and animal watching	M
20.	Hunting tourism	M
21.	Sports tourism	M
22.	The availability of mountain tourism	H
23.	Fishing	H
24.	The availability of trips	L
25.	Promotion of nature-based tourism	L
26.	The role of the local community in management protection	L
27.	The availability of ethno-villages or settlements	M
28.	Unplanned construction	H
29.	The proximity to potential environmental pollutants	M
30.	The use of natural resources	H
31.	The presence of domestic animals	H
32.	The proximity to agricultural land	H
33.	Eliminated the problem of wastewater from the settlements	M
34.	Tourism development planning	M

Source: Author, based on Maksin et al., 2011 and Puzović et al., 2015

The analysis of the assessed indicators concludes that the Autonomous Province of Vojvodina has a relief that is characteristic of lowland areas, which has a favorable impact on the climate and the formation of ecosystems in this area. Also, it is concluded that the relief greatly impacts the adoption of protection measures for various spatial units, and therefore the constitution of protected natural areas and sites of Vojvodina, important for the conservation of these valuable biogeographical units. This relief has a positive effect on the development of nature-based tourism (Lazić et al., 2008).

The climate of a certain area, together with its morphology, defines the type of vegetation that can be characteristic and endemic to a place, although people often change it over time. Proper analysis of biogeography is essential for the management of most tourism destinations, which are important for all outdoor activities, including nature-based tourism. Climate has a direct impact on the biogeographical distribution of natural vegetation in the region. The favorable climate of Vojvodina has had a significant impact on the characteristic flora and fauna in this area, in terms of the diversity of organisms, some of which are endemic. The same favorable impact was reflected in the formation of characteristic habitats such as the eolian and wetland, which again represent rare forms of geodiversity, characteristic of the province. This represents a significant basis for the development of nature-based tourism. This form of tourism in Vojvodina can be developed throughout the year.

Many protected natural areas on the territory of the Autonomous Province of Vojvodina are precisely wetlands with rare plant and animal species, which mutually form a single biogeographical diversity (Stojanović et al., 2018). There are also numerous lakes and ponds of fluvial, eolian and artificial origin. The Vojvodina marshes are a subject of interest in the UNESCO because they form a kind of oasis of the natural world. Wetlands represent significant potential for the development of science tourism, ecotourism, fishing, sports tourism, bird watching, and other forms of nature-based tourism.

In addition to the above, the scientific-educational and recreational significance of the natural base should be emphasized, because these areas are also terrains with attractive motives for tourism (Vujović et al., 2018). All this confirms the interest of various economic and social structures in the use of the space of Vojvodina. Therefore, it is necessary to harmonize all these needs and put them in correlation with the function of nature protection and the development of nature-based tourism.

The flora and fauna represent a significant resource of this area. Protection systems are established with the aim of conserving these values because these areas very often suffer different and high levels of impact from users, due to their attractive attributes. Visits to certain areas are accompanied by intensive construction and the presence of other entities that draw on the resources of the environment. Prohibited hunting and the impact of prohibited agricultural chemicals on the flora and fauna are no less present. Each of these changes in the elements of the environment affects the reduction or destruction of species and thus biodiversity. The protection of flora and fauna is the basis for the development of nature-based tourism. By spending money in these tourist destinations, one directly invests in protection. The economic factor is a factor in all activities and tourism as well (Leković, 2020).

5. Conclusion

The Autonomous Province of Vojvodina has a variety of natural resources for the development of nature-based tourism. There are various reliefs, climate, hydrography, flora and fauna and protected natural areas. Tourism of the 21st century is characterized by tourists who are increasingly enjoying nature. Tourism uses natural resources. By examining selected indicators of the development of nature-based tourism, the connection between nature and tourism can be established. Research results of this article indicate that certain natural resources are important for nature-based tourism development (Delić et al., 2017). The high significance “H” has indicators as location, relief, climate, hydrographic objects including wetlands, different species of plants and animals and availability of mountain tourism, fishing. Indicators with a medium “M” result are endemic species, natural area protection status, the sufficient number of supporting tourism facilities, available visitor

center, marked walking and educational trails, developed scientific tourism, sports tourism, bird and animal watching, natural photographing and hunting tourism. These research results will be used for the nature-based tourism strategies of protected natural areas of Vojvodina (Lazić et al., 2008). These natural factors are important for tourism development. The factors that are marked as low (“L”) are: endangered species according to IUCN, species reintroduction, international area protection status, accommodation service, developed ecotourism, the availability of trips, promotion of nature-based tourism and the role of the local community in management protection (Krstić et al., 2020). These natural factors need to be improved with various strategies of development (Buclet & Lazarević, 2015; Cvijanović et al., 2020).

The relief of Vojvodina enables the development of mountains, trips and sports tourism. The mountains Fruška Gora and Vršac Mountains are important for that. The climate allows the development of nature-based tourism throughout the year. Moderate temperature and precipitation do not have an impact on tourist activities. Flora and fauna represent significant tourist potential. The forms of tourism in which the main motive for travel is flora and fauna are ecotourism, adventure tourism, bird and animal watching, sports tourism, trips and other forms of nature-based tourism. The endangerment of flora and fauna affect the formation of protected natural areas. This impacts the development of scientific tourism. The analysis of the research results leads to the conclusion that the natural resources of protected areas in Vojvodina have an impact on nature-based tourism. Due to the distinct natural potentials, nature-based tourism should be developed. The realization of nature-based tourism can generate significant income. A large part of the income can be invested in the protection of areas, development of tourism infrastructure and all forms of tourism. This is the result of the research in this paper. The limitation of the research is that there are numerous settlements in the area of protected areas. The majority of the population of these settlements use resources of protected natural areas for their own needs and daily activities and it was difficult to separate them from the tourist use.

The research results will be used for future research of sustainable tourism development which is based on natural resources and the improvement of natural values.

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