

Development of Cave Tourism in the Domica Area in Slovakia

Abstract

The purpose of the study. The main goal of the study is to determine the most effective solutions for the development of cave tourism and medical tourism, as well as the standard of living and infrastructure of the region, based on the used literature and the questionnaire research on tourism development.

Applied methods. The study starts with information about the natural and geological heritage found in the Domica region in Slovakia. It continues with the discovery, construction and characterization of the most significant caves from a tourist and economic point of view. Following the professional characterization, the questionnaire research developed and evaluated in the last stage of the study analyzes the possibility of the development of cave tourism and health tourism in the immediate vicinity of the Domica Cave based on the opinions, remarks and experiences of the service providers in the area.

Outcomes. Caves are called natural underground cavities that have formed as a result of geomorphological and geophysical processes under different natural conditions. The caves in the karst are dissolved or are created by the weathering of the bedrock, while after the leakage of gases, caves form as cavities in the volcanic rocks. Few countries have as many different underground karst formations as Slovakia, with 7,014 known caves, of which only 18 can be visited. Discovering these underground wonders is a new challenge for hikers. Interest in caves peaked in the 20th century, when the desire to return to nature and improve the health of patients with respiratory diseases (speleotherapy) became the leading motivation. Today, caves are most often used for recreation. Nevertheless, within geotourism a popular way to explore caves is caving and the associated extreme or less extreme sports that only came to the fore in the 21st century.

The results of the research of this study are sufficient evidence that the region is suitable for the development of cave tourism and medical tourism, for which the most obvious solution is to create an international geopark.

Keywords: cave, geotourism, questionnaire, research

1. Introduction to cave tourism

A hollow underground space created in the earth's crust by natural processes that is more than 2 meters long or deep and whose surface opening is smaller than its length or depth is called a cave. The caves can be classified as natural monuments. The most important and valuable are the caves of the Slovak Karst and the Dobšiná Ice Cave, which is registered on the UNESCO World Heritage List.

The most important cave site in Slovakia for the development of cave tourism is the Slovak Karst National Park, located in the southeastern part of Slovakia. It forms a single unit with the adjacent Aggtelek National Park (Hungary), which is the largest plain-type karst area in Central Europe. The 361.65 km² Slovak Karst is considered as one of the most beautiful areas in Slovakia with its natural and cultural diversity. The National Park was established on February 13, 2002 and has been characterized as a protected landscape area since 1973. This is the first Slovak biosphere reserve since March 1, 1977. In 1995 the caves of the Slovak Karst and the Aggtelek Karst were inscribed on the UNESCO World Heritage List.¹ There are about 1,300 caves in

¹ https://www.researchgate.net/publication/323021308_Caves_as_touristic_attractions_in_Hungary_Adventure_health_culture_ecotourism

the Slovak Karst. From a tourist point of view, the Gombaszőg Cave (Gombasecká jaskyňa), the Jászó Cave (Jasovská jaskyňa), the Buzgó Cave (Krásnohorská jaskyňa), the Ochtina Aragonite Cave (Ochtinská aragonitová jaskyňa) and the Domica Cave (jaskyňa Domica) are the most significant.

The caves, characterized as a protected natural treasure, can be visited mainly within guided groups. From the point of view of the needs of the visitors, the forms of cave tourism are most often divided into the following: open-to-visit caves, barrier-free caves with guides, and caving.

While visiting the freely accessible caves, visitors have the opportunity to observe the natural beauties in the immediate vicinity. In addition to a certain amount of relaxation, they gain knowledge about the historical development of the cave. A special form of cave visits is caving, which is classified as an extreme sport and is characterized by physical condition, endurance, special equipment (lighting, helmet, etc.).²

Due to the precise definition, characterization, and promotion of geological tourism, interest in cave tourism increased exponentially in the late 20th and early 21st centuries.

The view of the protection of the natural heritage and the rethinking of symbiosis with nature has come to the fore.

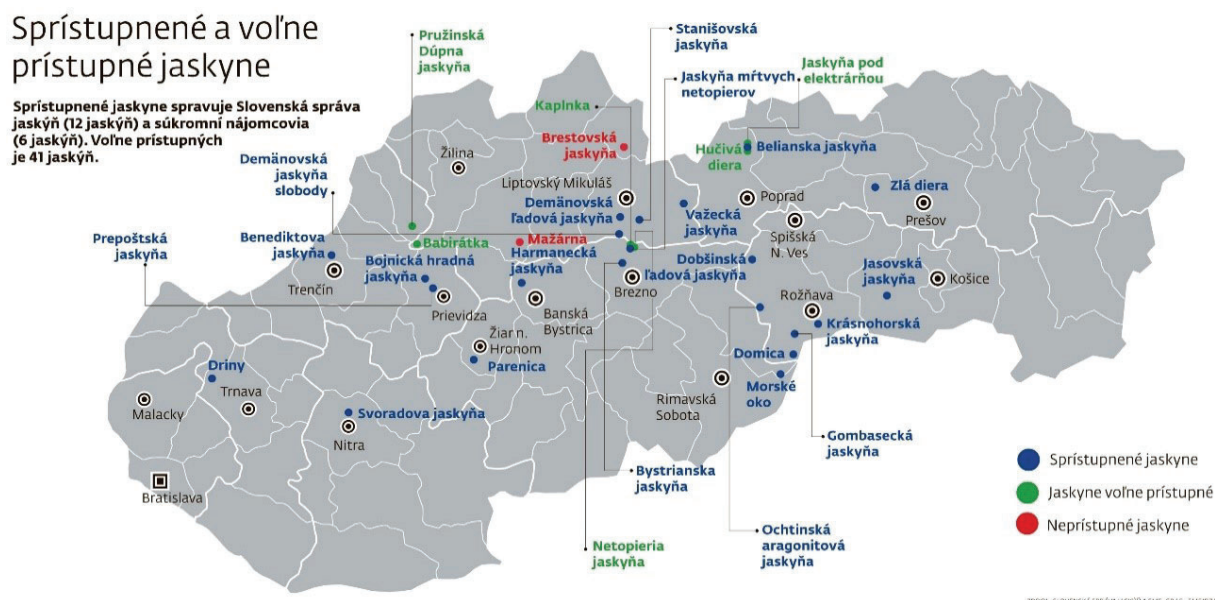
The following study highlights the current state of interest in caves, the range of opportunities offered by cave tourism in the selected cave, and the opportunities for developing its use.

2. Description of the most significant caves from the point of view of cave tourism

Most people do not know that Slovakia is one of the Central European countries with the highest amount of karst phenomena.

Public attention is usually focused on just a few caves that are most visited during sightseeing and hiking trips. Most of the more than 7,000 caves in Slovakia are known only to experts, karst lovers and cave tourists.

Picture 1. List of caves for tourists



Source: <https://domov.sme.sk/c/8096232/na-slovensku-mame-tisice-jaskyn-vacsinu-nepozname.html>

² <https://sk.wikipedia.org/wiki/Jasky%C5%88a>

³ <https://kamnahory.sk/Jaskyne/Sprístupnene-jaskyne/>

The basis for the development of ecotourism is undisturbed or minimally altered natural resources. The term ecotourism encompasses: visiting, admiring and observing living or inanimate nature, and at the same time summarizes a wide range of forms and types of tourism, from recreational tourism through health tourism to experiential tourism. The main common motive of the above forms of tourism is to stay in the natural environment in order to obtain as much information as possible about the area and the processes that take place in nature.⁴

One of the youngest forms of nature tourism is geotourism, which is based on the geological and geomorphological recognition and observation of inanimate nature phenomena. Places for the development of this type of tourism in Slovakia are: caves, mountains, river valleys, ditches, etc.⁵

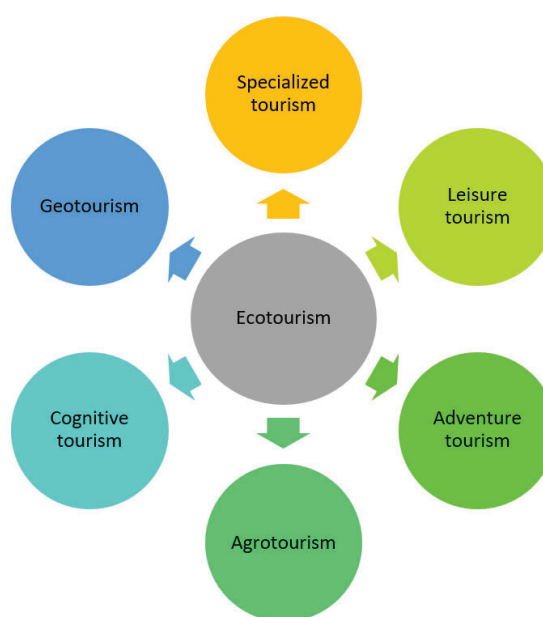
2.1 Characterization of Dobšiná Ice Cave

If we had to list the seven natural wonders of historical Hungary, the Dobšiná Ice Cave would undoubtedly be among them. Professional circles classify it as one of the most significant ice caves in the world, as its ice mass is unusually large, more than 110,000 cubic meters, which is also a rarity in the area outside the alpine highland zone. A contribution to this in 1972 was the discovery of the Stracena Cave, which became a continuation of the ice cave and became one of the most significant caves in Slovakia with its extensive passages and huge halls.

On the early morning of June 15, 1870, an 8-man team set off from Dobsina in the direction of Stracena. The head of the team was Nándor Fehér, a doctor from Dobsiana, known as a supporter of the research of natural strangeness. Jenő Ruffínyi, a 24-year-old mining engineer, was the first to descend into the cave. Through today's Small Room he reached the Great Hall and then the Ruffínyi corridor.⁶

Enthusiasm was boundless. The cave was visited the next day by a group of citizens from Dobšiná. The city leadership thanked the brave explorers and then undertook in writing to properly manage and preserve the unique natural phenomenon for which it was willing to make all sacrifices. He also promised to open the cave and to use the proceeds to maintain and beautify the environment. The management and protection of the cave was entrusted to the urban forestry. Soon in 1872-1873 a hotel was built, which was later expanded. His scientific observation was not neglected either. As early as 1870, White Doctor began measuring the temperature of flights. Based on more detailed measurements József Sándor Krenner, a professor at the Budapest University of Technology, tried to shed light on the cause of the ice. His experience was published in 1874. In the same year, a detailed description of the ice cave was published by János Pelech, Chief Physician of Dobšiná.

Picture 2. **Forms of tourism [own work]**



⁴ <https://slovakia.travel/co-vidiet-a-robit/priroda-a-krajina/jaskyne>

⁵ <http://www.smopaj.sk/sk>

⁶ Gaál Lajos (2010), *Gömörország természeti öröksége*, Bratislava, ISBN: 9788089455027

After 1890, the number of visitors reached three thousand a year. In 1883 it was visited by Pavol Országh Hviezdoslav and Mór Jókai. As a result of the growing number of visitors, on the initiative of the mining director Kálmán Münnich, the town of Dobsina already illuminated the Great Hall in 1881, among the first ones in Europe, and then in 1886 introduced the electricity with the help of a generator.

In 1911 the Hungarian State Meteorological Institute also established a permanent observatory in the Great Hall. In 1914 the lighting of the cave was connected to the city power lines.

However, the cave's brilliant career soon ended in World War I. After the war the number of visitors increased only slowly. In 1937 more than 23,000 people visited the cave, but World War II soon intervened. In 1945 during the fighting the hotel also burned down with some guestbooks. Although the hotel was rebuilt in 1949, the cave's ice formations which required proper treatment, were treated unprofessionally and steplessly. In 1954 the lighting of the cave and the itinerary were modernized. Figure skating trainings were still held in the Great Hall.

The preservation of the unique values of the cave was undoubtedly benefited by the establishment of the Slovak Caves Directorate in 1970, which involved the management of all 12 tourist caves in Slovakia under one roof. Later in 1998 the entrance building was renovated in its original form and a study trail was established on the way to the entrance. Thanks to the results of ice research, a meeting of the International Cave Association's Ice Caves was held in Slovakia in May 2006 with the participation of experts from 12 countries. The cave is actually a single huge bag-like cavity. Its entrance opens at an altitude of 969 meters, about 130 meters high towards the Gölnic stream.⁷

The Dobšiná Ice Cave, together with the Stracena Cave, was declared a national natural monument in 1996, as it is an outstanding natural value in many respects. In 2000 both caves were inscribed on the World Heritage List as part of the Slovak Karst and Aggtelek Karst. The openings of both caves are located in the Stratena National Nature Reserve, which is part of the Slovak Paradise National Park.

2.2 Characterization of the Gombaszög Cave (Gombasecká jaskyňa)

The Gombaszög Cave is a stalactite cave in the Slovak Karst. The cave was discovered on November 21, 1951, by an association of volunteer cavers from Rožňava, the Slovak Speleological Society, by digging a black spring.

The Gombaszög Stalactite Cave celebrated its 50th anniversary in 2005. Thanks to Ladislav Herényi and colleagues, the cave has been open to the public since 1955. A 300 metre section of the total length of the cave (1525 m) has been open since 1955. It also previously served as a sanatorium for the treatment of respiratory diseases. Since 1968, it was the first cave in Slovakia to be used for speleotherapy for 10 years. Thanks to the aerosol in the air, staying in the cave also has a healing effect. The air temperature fluctuates between 9.0 and 9.4 °C. The relative humidity varies between 95 and 97%.

In terms of development, the Gombaszög stalactite cave is one of the youngest caves in Slovakia. However, it has a very stunning decoration that includes sinks of different shapes, in rich colours, from white to yellow to ocher. A European characteristic is white straw 2-3 mm thick and up to 3 m long, which contrasts sharply with the reddish-brown coating of the walls. The cave is often called a fairy tale. Nature has given the drops various bizarre shapes and forms, which are still highlighted by the colourful colors and freshness as their creation continues. The

⁷ <http://old.roznava.sk/sk/--91-2665-jaskyna-dobsina->

most beautiful squares include the marble hall, the Peace Hall (Ladislav Herényi Hall), the Hall of Wisdom (Viliam Rozložník Hall), the Quill Hall and others.⁸

The Gombaszög Cave, as part of the Silice Cave system, with its unique straw stalactites is the one of the most outstanding natural phenomena in Gemer. Its protection is ensured as a national natural monument.

2.3 Characterization of the Jászó Cave (Jasovká jaskyňa)

The Jászó Cave is the longest accessible cave. It is well known for the occurrence of rich calcite sintered fillings where pagoda-shaped stalagmites, “stone” waterfalls, drums and straws attract attention. It is among the caves of the Slovak and Aggtelek karst in the natural heritage of the world. The cave was inhabited in prehistoric times, as evidenced by parts of the vessels and bronze objects. Many old inscriptions and drawings have also been preserved in the cave. It is said that the upper part of the cave was discovered in the Middle Ages by a monk of the Premontre order of Jászó so that the inhabitants of the village and the monastery could use it as a refuge.

Thanks to the superior Alojz Richter, the cave was opened to the public in 1846 as the first cave in Slovakia. At that time it was possible to cross the underground spaces with torches, about 250 m long. Other areas of the cave (Tigria corridor, upper floor) were discovered in 1923 and reopened in 1924 after modifications. Two years later electric lighting was introduced into the cave. The underground spaces of the cave reach the length of 2,122 metres and the vertical span is 55 metres. There are 314 steps in the Jászó Cave and during the tour the visitor can overcome up to 360.

The air temperature is 8.5 to 9.5 °C and the relative humidity is 90 to 98%, which are ideal for speleotherapy. The Jászó Cave is one of the three caves in the country for the treatment of respiratory diseases.

2.4 Characterization of the Ochtina Aragonite Cave (Ochtinská aragonitová jaskyňa)

The Ochtina Aragonite Cave differs significantly from the other caves due to its wonderful snow-white aragonite crystals, its marble passages and the special way in which they are excavated. The discovery of the cave was a result of the iron ore research. The iron ore deposits of the Upper Hrádok began to be cultivated in the 19th century. Mining continued after World War I, until 1927.

After World War II further research and excavations took place. It was accidentally discovered in 1954 during the excavation of the Kapusta geological exploration tunnel by ore miners Jelšava M. Cangár and J. Prošek in eastern Slovakia. In 1955 the touristic use was inspected by the staff of the state organization and in 1956 exploratory sounding work was carried out. Accessibility work began in 1966 with the excavation of a 145-metre-long access tunnel that allowed the cave to be opened to the public in 1972.⁹

The length of the accessible part is 230 metres. The oldest aragonite formations are nearly 140,000 years old. In the cave we can find three generations of aragonite, the first of which is 121-138 thousand years old.

The second generation is represented with the most needles curved for tens of centimeters long, about 14,000-year-old spiral helicitites. The youngest generation is currently forming on sediments and creating small fans of only 2 to 4 millimeters. The temperature of the cave is between 7.2 °C and 7.8 °C and the relative humidity is between 92% and 97%.

⁸ <http://www.sopsr.sk/web/?cl=20693>

⁹ https://sk.wikipedia.org/wiki/Ochtinsk%C3%A1_aragonitov%C3%A1_jasky%C5%88a

This is another world unique in Slovakia, as the cave is one of the three available aragonite caves on the planet. The other two are in Mexico and Argentina. The Ochtina Aragonite Cave, together with the Slovak Karst and Aggtelek Karst Caves, was inscribed on the World Heritage List in 1995 and declared as a National Natural Monument in 1996.

2.5 Characterization of the Buzgó Cave (Krásnohorská jaskyňa)

Its uniqueness lies in the fact that moving in it is accompanied by a certain dose of adrenaline and sports activities. Although the cave is public, entry is only allowed accompanied by experienced guides and full cave equipment. It was discovered by cavers in Rožňava in 1964 after the water level in the Buzgó spring was lowered.

Viliam Rozložník and some of his colleagues made an attempt to deepen the spring as early as 1953, and then resumed work in 1956, when the city of Rožňava commissioned earthworks for the drinking pipeline.¹⁰

The fact of the cave, which was excavated almost 700 metres long, received a great deal of press coverage. The idea of opening up tourism almost immediately arose. According to the measurements of engineer and geologist Árpád Abonyi, the works started in the autumn of 1964 mainly with the financial support of the Rožňava Local National Commission and the iron ore mines. During the excavation work the highest stalactite of the cave with a height of 32.7 meters was discovered.

In 1982 a corridor dotted with beautiful helictites was discovered. The length of the cave thus increased to 1100 metres. The cave has been a national monument since 1996.

The known length of the cave is 1556 metres. The hiking trail leads to the Rožňava Caves Chapel, one of the largest waterfalls in the world at an altitude of almost 33 m. Until recently it was included in the Guinness Book of Records. Buzgó Cave is a national natural monument. The protection of the area was declared in 1972 and amended in 2007. The opening of the cave was considered after its discovery, but the opening for the tourists only became a reality in 2004 thanks to J. Stankovič and his colleagues.

2.6 Characterization of the Domica–Baradla cave system

The 25.5 km long Domica–Baradla cross-border underground cave system from the border of Hosszúsó (Dlhá ves) – Slovakia to Jósvalfő – Hungary offers a truly magnificent sight to the visitor. Formed by underground streams, in some places it became a defining gem of the Gömör-Tornai karst thanks to its corridors of power, unique stalactite formations, valuable fauna and rich archeological finds. The main axis of the cave system is the Styx stream bed. The stream still flows from Domica to Baradla, where it picks up the Acheron stream and other tributaries. Later it falls into deeper regions to form another magnificent cave in a few hundred thousand years. On the Slovak side it is Domica, and on the Hungarian side it is the entrance to Baradla-Aggtelek and Vörös.¹¹

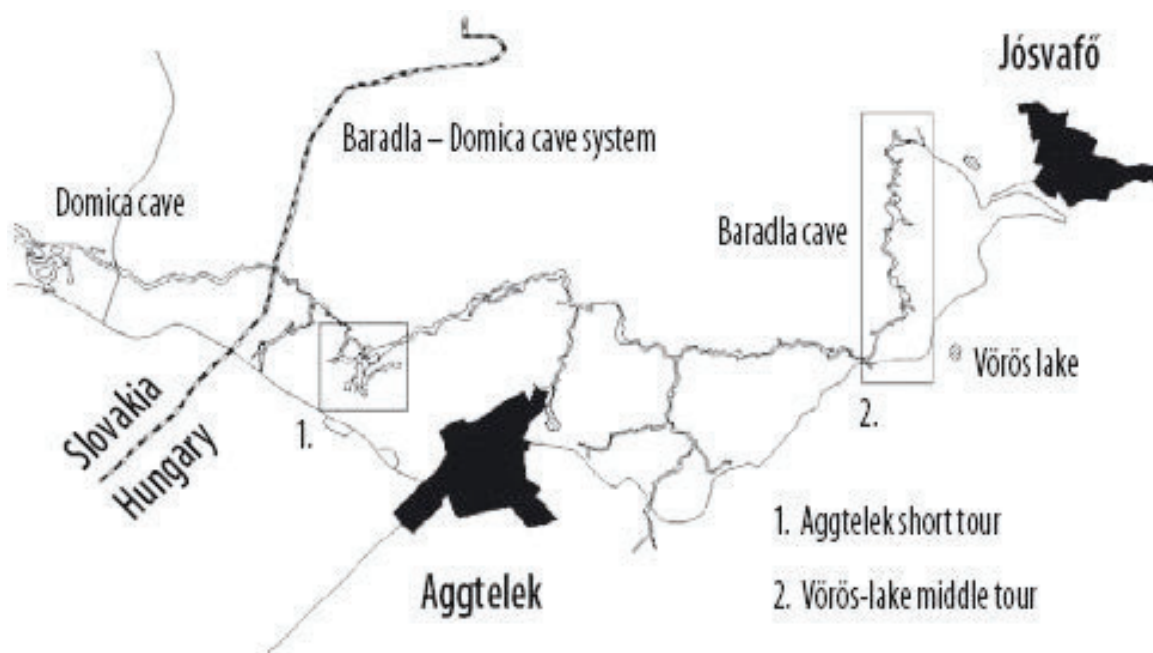
The total length of the Domica is 5,368 metres, that of the Baradla 20,196 metres. Much of the cave system has been known since the Stone Age. We have had memories of this special stalactite world since the 18th century.

However, Mátyás Bél's work *Notitia Hungariae Novae Historico Geographica*, which also describes the geography of Hungary, was published in 1742, in which he also mentioned Baradla. The first map of Baradla was made in 1794 by the mining engineer of the Eger estate, József Sartory.

¹⁰ <http://www.gemer.sk/ciele/kjaskyňa/hu.html>

¹¹ <http://npslovenskykras.soprs.sk/projekty/aggtelek-domica-curative-cave/>

Picture 3. Location of Domica – Baradla cave system



Source: http://anp.nemzetipark.gov.hu/index.php?pg=menu_2780

In 1807 a detailed description of the cave was published. The cave was visited by József Nádor in 1806. On this occasion the route of the visit was built, the entrance to Aggtelek was blasted, bridges and stairs were built so far. The underground passage itself was lit by many thousands of candles. A stalactite called the Palatine Column preserves the memory of the visit. Not far from it is the Ferdinand Column, named after Archduke Ferdinand, the later Hungarian king and Austrian emperor in 1817. There is also a Reviczky column, reminiscent of the Chancellor's visit in 1829, a colourful lettered, engraved stalactite intended for József Almássy, the head of Gemer, but there are also several inscriptions in the cave referring to other famous personalities.¹²

Dr. Pál Almássy Balogh published a further detailed description in his scientific collection in 1820 based on his own observations.

The importance and reputation of Baradla grew rapidly. In his travelogue published in 1839 by English physician John Paget, it was already described as a well-known excursion destination abroad. The underground stalactite wonder was not overlooked by Elek Fényes when compiling the description and geographical dictionary of Hungary.

Despite frequent visits by the middle of the 19th century the cave was in a rather neglected state. As a result, Károly Siegmeth, President of the First Scientific Cave Research Organization, initiated the management of the cave by the Hungarian Carpathian Association. Archaeological research at Baradla began in 1876. The excavations were organized by the Hungarian Historical Society. Thanks to research it has become one of the best-known Neolithic sites in the country.

The cave was declared as a national treasure by a decree of the Ministry of Culture in 1925, new concrete sidewalks and concrete bridges were built, and roads leading to the cave were built.

In August 1926 another cave in the Baradla, named Domica, was discovered. After its discovery the cave was treated by various organizations of the Slovak League. The tourist opening of the cave was finally realized by the Czechoslovak Tourist Club.

In 1930 a storage facility was built at the site of the current entrance, and in 1932 with the construction of concrete sidewalks and electric lighting, the cave was opened to the public.

¹² <http://www.slovensky-kras.eu/info/jaskyne-a-priepasti/jaskyna-domica/>

Earlier that year the water of the Styx Cave Creek was inflated, allowing for underground boating. In August of that year Hungarian cave researchers proved the connection between the two caves.

In 1935 the research of the cave continued under the leadership of the Karst Section of the Czechoslovak Tourist Club. Also that year large-scale renovations were carried out. In 1936 Governor Miklós Horthy also visited the renovated cave.¹³

After World War II Soviet soldiers set up a stable for it, and a flood in 1954 caused catastrophic damage to Domica and its archaeological finds. The Labyrinth Branch was built in 1960, later modernized and able to accommodate thousands of people. The caves of the Domica-Baradla cave system in both countries are strictly protected and under constant surveillance. Since 1940 – under the Nature Conservation Act of 1935 – they have been protected with a surface area of 10 ha.

The Baradla was then protected as all Hungarian caves are in Hungary as a result of the Hungarian Nature Conservation Act in 1961, and the Domica was declared a protected natural form in 1972. It has been a national natural monument since 1996. Baradla has been a highly protected natural value since 1982.

The cave system was inscribed on the World Heritage List in 1995 as a part of the cave world of the Slovak Karst and the Aggtelek Karst. In 2001 both underground wetlands, both caves were declared Ramsar sites. The two caves have a common protection zone.

On the Slovak side the Slovak Karst has been a nature reserve since 1973 and a national park since 2002. Domica belongs to the Directorate of Slovak Caves in Liptovský Mikuláš, while Baradla belongs to the Directorate of Aggtelek National Park in Jósvalfő. Cooperation between the two institutions is regular.

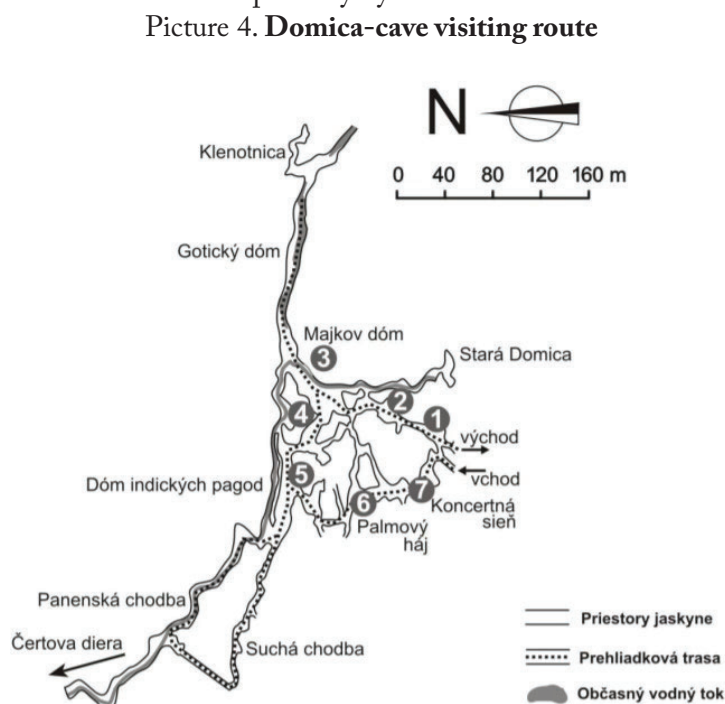
Ecotourism is an important part of active tourism. Although they have many features in common, active tourism is characterized by elements of adventure tourism, such as cave tourism.

The beneficial effects of caves in medical tourism are used during speleotherapy, which relieves or treats allergic and chronic diseases of the respiratory system based on the aerosol present in certain caves. Obtaining the Slovak Medical Cave Certificate could be an important milestone in the development of health tourism in the Domica Cave.

The most beautiful water cave in Europe, the Domica, is a stalactite cave on the Slovak side.

The Domica Cave together with the Baradla Cave forms a unique complex in the Aggtelek Karst, Hungary, with a total length of 30 kilometers. The visitor can choose from two types of cave viewing routes: 780-metre short guided tour or a long circuit with an impressive boat trip on the underground river Styx with a length of 930 meters

Due to its excellent natural endowments Slovakia has a Source: <https://lepsiden.sk/jaskyna-domica-pycha-gemera>



¹³ <http://www.gemer.sk/ciele/domica/domica.html>

significant capacity to develop cave tourism. Evidence of this is provided by summarizing and evaluating the responses of the participants in the questionnaire research.

3. Description and evaluation of questionnaire research related to the development of cave tourism

The main method of researching the experiences and attitudes of service providers to improve their promotional activities is a web questionnaire. The questions answered by the respondents focused on seeking ideas and inspirations for the development of cave tourism in the area, where the aim was to get as many answers as possible from existing service providers, respecting the anonymity of the respondents.

The questionnaire was sent in June 2021, primarily in the form of an e-mail, to the service providers participating in the research. The decisive factors in choosing the form to complete the questionnaire were time, distance and epidemic situation.

The target group was service providers in the local and immediate vicinity of the Domica Cave between the ages of 18 and 50. The research focused on a survey based on the current knowledge of service providers and employees related to cave tourism, taking into account, of course, sustainable development and environmental protection.

The analysis of the responses summarizes the effective ways to increase guest traffic and eliminate errors that negatively affect the development of cave tourism, including obtaining a medical cave certificate.

The results of the research are based on the following questions:

1. What do you think about getting a medical cave certificate?
2. What innovations would you use to improve the quality of cave tourism?
3. What forms of propaganda do you prefer?

The basic pillars of the questionnaire are the above questions, but in order to get an objective picture, other additional questions had to be asked, which examined the basic information, education, target groups, duration of the visit, the possibility of establishing a geopark.

The web questionnaire was completed by 80 respondents, more than 54% of whom are women. There is a minimal difference between the age groups of 20 to 30 years (27.8%) and 30 to 45 years (32.9%). For the other two age groups, the difference is 9.7%, i.e. respondents under 20 (14.8%) and respondents over 45 (24.5%).

In terms of educational attainment respondents can be divided into three groups: most respondents have secondary education (57.8%) and the fewest have primary education (4.2%). 38% of survey participants completed higher education.

The next section included questions about the service providers' experiences with visitors. Respondents surveyed included restaurant owners (41%), accommodation owners (27%), grocery store operators (12%), taxi service providers (9%), and others (11%).

Defining the target group is an important factor in planning and introducing new and interesting tourist attractions. Based on the analysis of the answers of the service providers to the target group, it can be stated that 68.9% of the respondents prefer the group of families with children. In case that the medical cave certification is achieved, in addition to improvements for the current target group, the primary tasks will be to ensure the establishment of health care and related quality services.

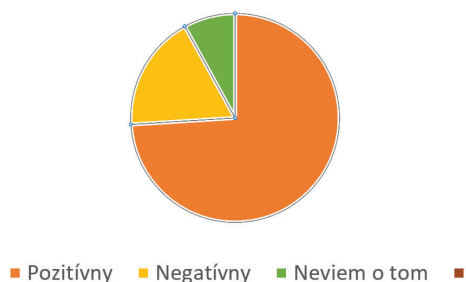
The region has a high unemployment rate. The development of medical and cave tourism would create new job opportunities to increase the number of employees, and this would have a positive effect on raising the living standards of the settlement. Expanding the services provided would also create opportunities for qualified tourism professionals.

When asked about the length of stay of tourists, 72% of respondents marked the one-day answer, pointing to insufficient accommodation capacity.

The main part of the analysis is the answers to the questions asked in the second part of the questionnaire. The questions focused primarily on past experiences and opinions on the future of the area within rural and cave tourism.

Figure 1. **Provider s opinion on obtaining a medical certificate**

Aký máte názor na získanie certifikátu liečivej jaskyne?

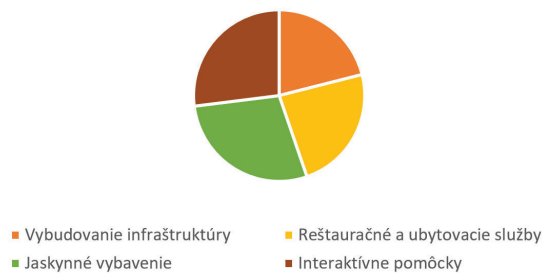


A large number of respondents (74%) confirmed that they see the possibility of obtaining a medical cave certificate due to the possible development of existing cave tourism. A significantly lower number of respondents have a negative attitude towards this question. Their rejection was justified in several cases by a disproportionate increase in mass tourism, which would have a negative impact on environmental protection (18%). Surprisingly, a small percentage of respondents (8%) did not have information about a promising opportunity to develop tourism in the locality.

The positive attitude of the majority of respondents reflects the promotion of sustainable, responsible and quality tourism in the municipality by increasing its competitiveness while making better use of its potential, with the aim of levelling out regional disparities and creating new jobs.

Figure 2. **Infrastructure development**

Aké inovácie by ste využili na zvýšenie kvality jaskynného turizmu?



Based on the comments of the respondents, which relate to another issue related to the improvement of the secondary supply in the settlement, it can be stated that the successful development of cave tourism is determined by the expansion of the range of existing services.

The majority of service providers (64%) expressed the opinion that the technical infrastructure should be reconstructed and built in accordance with European standards (lighting, roads, car parks, stairs,

interior equipment, landscaping parks, etc.). Service providers have identified restaurant and accommodation services (72%) as part of the promotion of rural tourism and as a means of creating new job opportunities as a very important component in expanding their product range. The responses show that the most important component for the respondents (86%) is the creation of opportunities to sell and rent cave equipment from beginners to professionals. Respondents showed great interest (82%) in introducing and using interactive educational aids that can provide useful information about local geology, educational trails, bike paths, natural resources, and the cave itself.

The last question focused on forms of marketing. It is clear from the responses that respondents (57%) prefer the development of a quality and up-to-date website and appropriate, active e-marketing communication on social networks. A smaller proportion of respondents (39%) also mentioned traditional marketing communication tools as an important component.

Based on the good and prosperous relationship with neighbouring Hungary, the third group of respondents (71%) considers the geopark to be established on the model of the Novohradský Nógrád geopark to be the most effective tool for promoting the development of cave tourism. Geoparks offer an opportunity for significant development of geotourism.

With its unique cave system of the Slovak Karst, which is on the UNESCO World Heritage List, it meets these conditions and can even integrate very quickly into the Global Network of Geoparks.

The summary of the analysis of the answers to the questionnaire research forms a clear picture of the service providers' opinions, views and opportunities for development. The possible acquisition of a medical cave certificate opens up an even wider range of natural and human potential.

Intensive rural and cave tourism and the number of visitors can lead to the partial destruction of the environment and interference with the natural cycle of flora and fauna. For this reason, it plays an important role and the protection of caves and nature comes to the fore.

All caves that can be visited are considered national natural monuments, therefore their appropriate and optimal use is based on monitoring the impact of visitors. In the Slovak Republic, the protection and operation of the caves that can be visited is ensured by the Slovak Cave Directorate in Liptovský Mikuláš. It is listed as an organizational unit in the State Nature Conservation Institute of the Slovak Republic, which is a professional nature conservation organization of the Ministry of Environment of the Slovak Republic. The activities of the Slovak Caves Directorate focus on the management and safe and sustainable use of all caves.

In addition to the above activities, it takes care of the facilities and equipment located in the underground and cave entrance areas, ensures their maintenance and operational safety.

4. Summary

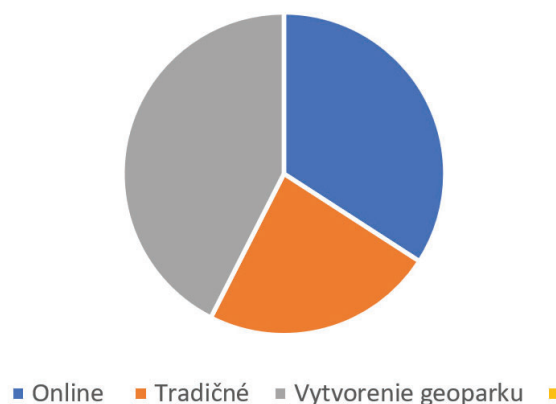
The beauty of unusual natural phenomena, caves attracts visitors from the public to experts. They are enchanted with the diverse formations of drop decoration, rock formations, artistic ice creations, canyons and lakes full of crystal-clear water created in the underground spaces. They create a home for various species of small animals that have adapted to underground life. They preserve the memories of the ancient past, which relate to the lives of the ancient representatives of mankind, as well as often important sites of archaeological finds.

The caves of the Slovak karst system are known for their highest stalagmic, aragonitic and sintered formations, as well as an ice-filled ravine, making them unique in Central Europe. They are also on the UNESCO World Heritage List.

The largest cave in the Slovak karst, the Domica, was ranked among the first. Despite its natural and geological features, its popularity and use are unsatisfactory. The low level of secondary services and additional tourist attractions results in stagnant tourism. The results of the research show that the service providers have a clear positive attitude towards the development of cave tourism and the creation of appropriate conditions for the therapeutic use of the cave.

Figure 3. Using of marketing tools

Aké formy propagácie usprednostňujete?



In summary, the aim of the cave and geotourism itself is to protect the geological and natural beauties of the area, in addition to attracting active information to the area and providing useful information to the incoming visitors through advertising campaigns.

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