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Assessment of the demand for cultural ecosystem services in Local Action Group association of municipalities: a case study from Slovakia

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Abstract

This paper deals with the assessment of the demand for cultural ecosystem services (CES) using participatory mapping in the Local Action Group (LAG) Association of Municipalities of the White Carpathians and Trenčín Microregion and the Bošáčka Microregion, Slovakia. CES as non-material services provided by ecosystems are linked to tourism and its development. While, tourism is not very developed in the case study area, the preferences of residents and visitors to the area were investigated and compared. The aim of this paper is to map the demand for CES, both from the perspective of residents and visitors, and to propose appropriate forms of tourism for LAG municipalities based on the different demand for CES. We collected the data using a questionnaire survey at selected locations in the territory of the LAG from July to October in 2023, while aiming at two target groups (n=100 and n=108). Participatory mapping helped to identify CES demand locations in the country. Based on the results, we established a hierarchy of the importance of locations in terms of tourism interest. The survey shows that the demand for CES is influenced by the availability of the location as well as the availability of information about the area. In the case of attractive locations, both residents and visitors were willing to tolerate the lack of tourism services such as small number of accommodation and catering facilities, incomplete information or worse transport accessibility. Research showed that high demand for CES prevails among residents and visitors in the same locations, but residents identified more locations where demand for CES occurs. The results of the research are of considerable importance in the implementation of the concept of ecosystem services in the territory development documents, since on their basis it is possible to strengthen and especially optimise the development of tourism in the territory.

Highlights for public administration, management and planning:

- This paper assesses demand for cultural ecosystem services (CES) using participatory mapping within specific regions of Slovakia, with a focus on tourism and development in less-visited areas.
- Data collected from residents and visitors shows shared interest in high-demand CES locations, where limited tourism infrastructure is tolerated due to the area's natural and cultural appeal.
- Findings provide insight for integrating CES demand into regional development plans, aiming to enhance and optimize tourism sustainably based on local and visitor preferences.

Keywords

Cultural ecosystem services,
Demands,
Local Action Group,
Participatory mapping,
Tourism

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1 Introduction

Ecosystem services (ES) represent the contributions of ecosystems to human well-being (Costanza 1997). These are contributions and conditions that fulfil and improve human life (GC 1992). According to Millennium Ecosystems Assessment (MEA), ES are the benefits that people derive from ecosystems (MEA 2005). Ecosystems provide a certain potential to provide services (van Oudenhoven 2012) and only the demand from human society transforms them into ES (Schröter 2014). Demand for ES expresses the extent of desired services required by society (Villamagna et al. 2013). It is a summary of all ES that are required in a specific area at the same time (Burkhard 2012). The demand expresses individual preferences of residents for specific services, their location and time availability, and related costs of use (Schröter 2014).
(MEA 2005) divides ES into 4 categories, one of which is cultural ecosystem services (CES). TEEB and CICES also use a very similar designation (Kumar 2010; Haines-Young & Potschin 2011; **?**). The IPBES platform divides ES into regulatory, material and non-material, which also include CES (IPBES 2017). CES integrate immaterial, mental and experiential ES, therefore it is possible to label them as non-material or intangible ES (Small et al. 2017). Thus, CES are intangible, subjective and difficult to evaluate (Chan et al. 2012; Daniel et al. 2012), because they include social aspects on which they depend. They are suitable for studying the link between human well-being and ES because they take into account the directly perceived benefits of CES (e.g. recreation).
In this paper, 3 CES were assessed according to Mederly & Černecký (2020), who created a list of ES relevant for the territory of Slovakia. The authors understand CES as intangible benefits derived from ecosystems and biotic elements of the landscape, mainly as physical and experiential relationships, intellectual and representational relationships, spiritual and symbolic relationships, and other cultural outcomes. The first CES assessed is Recreation and Tourism: Physical Use of Nature and Landscape. This CES relates to the presence of people in ecosystems that provide spiritual enrichment and development and leisure as an intangible benefit. The second CES assessed is Landscape Aesthetics: Aesthetic Values, which encompasses the perception of the aesthetic values of a landscape and its beauty with its distinctive features that distinguish a given landscape from another (the characteristic appearance of a landscape). The third CES assessed is Natural and Cultural Heritage: Intellectual and Scientific Values, which is linked to the existence of traditional landscapes shaped by a specific relationship between people and nature (e.g. dispersed settlement, traditional agriculture, orchards). It is a heritage from the past passed on to future generations, represented by natural or cultural heritage (tangible and intangible elements) (Mederly & Černecký 2020, Mederly 2020, Špulerová 2018). For the purpose of this research, we have abbreviated the names of the CES mentioned above: CES Recreation and Tourism, CES Landscape Aesthetics, and CES Natural and Cultural Heritage.
Many studies aim to integrate ES assessment into decision making processes (e.g. TEEB, NEA, OpenNess). One of the main aims of ES research is to map them and visualize the results for decision making (Polizzi 2015). However, the collaboration between scientific research and the application of results in practice is still in the process of being established (Tammi et al. 2017). The integration of ES into regional development planning is important for the sustainable development of a region, as they have a significant impact on the connections between regional economies, societies, and the environment (Gao 2019). The integration of ES at the strategic level is expected to provide a more comprehensive understanding of the values at stake and the trade-offs that may arise from land use decisions (Groot 2010).
Act No. 539/2008 Coll. on support for regional development understands regional development as a set of social, economic, cultural and environmental processes and relationships that take place in a region and contribute to increasing its competitiveness, sustainable economic development, social development and territorial development, and to balancing economic disparities and social disparities between different areas (**?**). In Slovakia, regional development can be realised through Local Action Groups (LAG) that have developed a Community Led Local Development (CLLD) Strategy (www.nsrv.sk). In regional development are many problems from the planning processes (e.g. regional planning, spatial planning, landscape planning, environmental planning and management, land use) that are part of the ES assessment (Frank et al., 2014). In some cases, the ES concept has been successfully applied (Faith & Walker 2002;Bryan & Crossman 2008; Grêt-Regamey et al. 2008; Groot 2010; Barral & Oscar 2012; Maes 2012) Nevertheless, Seppelt (2012) notes that implementation in regional planning documents is rare.

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ES are inherently spatial (Boyd & Banzhaf 2007; Schägner 2013), although some services are undeniably easier to identify on a map than others with the same accuracy, precision and resolution (Tammi et al. 2017). Participatory mapping is one of the forms of participatory research that emerged from the need for spatial data collection methods. This research incorporates a variety of methods including mind mapping, sketch mapping and participatory geographic information systems, with participatory mapping being multidisciplinary in nature (Denwood et al. 2022). Mind mapping is often used in geography (Pánek 2016; Thompson 2020), social sciences (Catney et al. 2018), sustainability sciences (Guckian 2018), urbanism and urban planning (Brennan-Horley & Gibson 2009; Pánek 2016) and spatial planning (Pfeiffer 2008). Mental maps were used to analyse and visualise environmental preferences of the population (Lehnert 2021). Mental maps are constructed in two ways. A Gould-type map is created on the basis of verbal information from the respondent and only secondarily processed into a map produced by a cartographer. Examples might be maps with information about where the respondent would like to live or where they would like to go on holiday. A Lynch-type map is created directly by the respondent and the result is a sketch, diagram or image of his/her perception of space (Pánek 2014).

At the end of the last century, a new paradigm emerged in landscape research - transdisciplinary, which includes participation (Sevenant & Antrop 2010). Participatory processes are useful and offer many benefits (e.g. process of the Environmental Impact Assessment - EIA) because scientific expertise is enhanced by local experience, opinion and knowledge, as well as the importance of social judgement (Milligan 2009). Participation can also strengthen consensus in decision-oriented planning processes (Bond 2004). According to Billgren & Holmén (2008), in theory everyone is a participant in a country's planning processes, although mostly only organized groups (stakeholders) are represented. For this reason, participation should not only include stakeholders who are direct actors in the processes, but also the public represented by all interested actors. Thus, participation should also include interested parties outside the study area (Lidskog & Soneryd 2000; Bond 2004; Sevenant & Antrop 2010). Stakeholders are most often divided into groups based on socio-economic characteristics. Different stakeholder groups involved in landscape planning processes often hold different views stemming from their belief systems, which are related to research in environmental behaviour and psychology (e.g. Schultz & Zelezny 1998; Dunlap 2000; Kaiser 2005; Kurz 2005; Kellstedt 2008; Mostafa 2007; Peterson 2008; Ruff & Olson 2009). The aim of the research was to map the demand for CES in the LAG territory using participatory mapping and to compare preferences among residents and visitors to the territory. Demand was mapped for three CES (according to Mederly & Černecký 2020). The results were compared with selected regional development documents that are relevant for tourism development. The different CES are connected and complementary to each other. Tourism as an aspect of regional development is not only represented by the CES Recreation and Tourism, but also by other CES. A tourist chooses the visit of location according to whether the natural and cultural heritage is present and whether the location is aesthetically valuable and has its own distinctive appearance. Hence, the CES Natural and Cultural Heritage by what creates the preconditions for the CES Recreation and Tourism and the CES Landscape Aesthetics (Clemente 2019; Chan et al. 2012; Daniel et al. 2012).

The LAG is a grouping of representatives of public and private local socio-economic interests in which neither the public authorities nor any interest group has more than 49 % of the voting rights at the decision-making level (www.nsrv.sk). In the context of the CES assessment, LAG members can be seen as stakeholders who are directly involved in decision-making and planning processes in the territory. In this case, visitors to the territory are excluded from decisions on the further development of the territory (including tourism), but this is also true for the majority of the residents of the LAG territory. For this reason, we have selected residents and visitors of the LAG as the focus groups of the research. We assume that the focus groups of the research (residents and visitors of the LAG) will have different preferences in the choice of tourism sites (e.g. nature observation, visiting cultural and historical monuments), as well as the quality of tourism services provided. Data collection was conducted in person in the territory of the LAG from July to October 2023.

1.1 Case study area

The case study area (Fig. 1) is located in the western part of Slovakia, bordering the Czech Republic to the northwest. According to the administrative division, it is located in the Trenčín Region. The case study area consists of 11 municipalities, of which seven (Drietoma, Kostolná-Záriečie,

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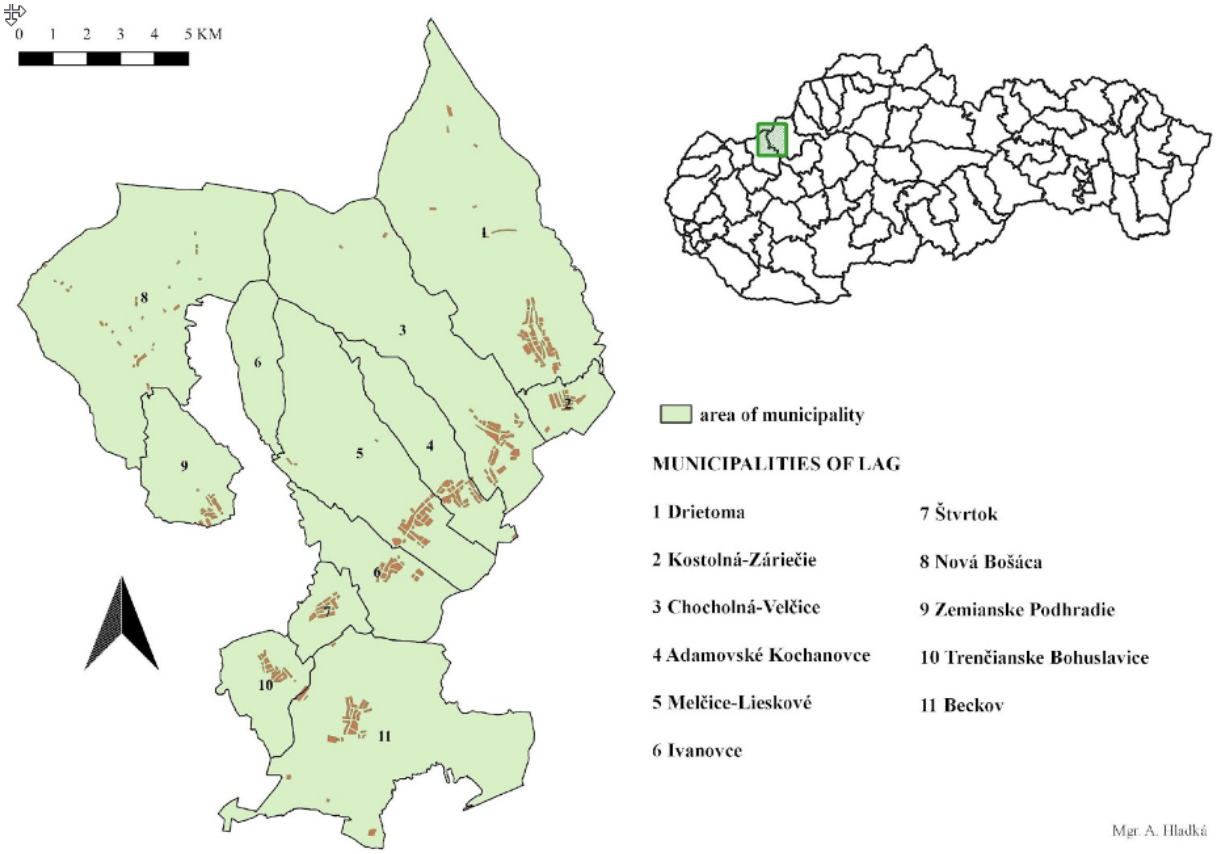

Fig. 1 Localization of LAG

Chocholná-Velčice, Adamovské Kochanovce, Melčice-Lieskové, Ivanovce and Štvrtok) are located in the district Trenčín and four (Nová Bošáca, Zemianske Podhradie, Trenčianske Bohuslavice and Beckov) in the district Nové Mesto nad Váhom. The highest point of the area is Veľký Lopeník hill (911 m above sea level), located in the municipality Nová Bošáca (the state border passes through its peak). The case study area has an area of 194.5 km^2 and in 2020 there were 12712 residents.

The axis of the case study area is the Váh River, which flows through the Považské podolie valley. The Považské podolie valley is bordered on the western side by the White Carpathians and on the eastern side by the Považský Inovec Mts. The case study area is bordered to the south by the Small Carpathians Mts. and the Podunajská pahorkatina hilly area (CLLD Strategy 2022).

Due to the fact that tourism has a great influence on the assessment of CES, we decided to briefly analyse the infrastructure and objects of tourism in the case study area. We focused mainly on the density of marked tourist routes (hiking trails, cycling routes), including educational trails (ET) and accommodation and catering facilities. Tourist routes represent linear elements of an anthropogenic nature that allow access to natural, cultural and historical monuments. Their route is marked so that they pass through locations with an aesthetically valuable view, but at the same time do not disturb the protection of nature and the landscape (Kenderessy 2018). Dispersed settlement is typical for the territory (Špulerová 2013, Petrovič & Petrikovičová 2021; Švoňavová 2024). We hypothesize that well-marked and connected tourist routes that allow access to the natural and cultural heritage and aesthetic values of the country can increase the demand for CES. Accommodation and catering facilities enable a multi-day visit to the case study area, because the provided paid services (e.g. cleaning services, wellness services, overnight accommodation, purchase and preparation of food, sometimes the organization of smaller cultural events - disco, guided tours) temporarily replace housing and the feeling of home especially visitors to the territory. Tourism infrastructure and the quality of services provided and their

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availability are important factors influencing the development of tourism.

For a better comparison, we use Mapy.cz (2024) and Freemap.sk (2024) mapped the marked tourist routes in the QGIS 3.18 program, while we used the tools Search QMS and XYZ Titles. In the next step, we calculated the length of tourist routes for individual villages using the $length (Calculator) function. This is how we found out how many kilometres of the route are per 1 km^2 of the village. In Fig. 2 it can be seen that the village of Beckov is the only one with enough of all 3 categories of marked routes (hiking trails, cycle routes and ET). The municipality of Trenčianske Bohuslavice has a high density of hiking trails and cycle routes. For this reason, we can claim that the villages of Trenčianske Bohuslavice and Beckov have the most marked hiking trails, although there are no ET in Trenčianske Bohuslavice. They are found only in Nova Bošáca and Beckov. The village of Drietoma also has a relatively good density of hiking trails and cycle routes. Although Kostolná-Záriečie has only one marked cycle route, the density is above average, because it is the smallest municipality of the LAG. The worst are the villages of Adamovské Kochanovce and Štvrtok, which have no marked route.

Similarly, as the density of marked tourist routes was calculated, we calculated the density for accommodation and catering facilities (Fig. 3). The highest density of accommodation and catering facilities is in Trenčianske Bohuslavice and Beckov. There are also enough accommodation facilities in Chocholná-Velčice. There are accommodation facilities in Zemianske Podhradie, but there are no catering facilities. On the contrary, there are accommodation facilities in Drietoma, but there is a larger number of catering establishments. There are no accommodation or catering facilities in Kostolná-Záriečie, Adamovské Kochanovce and Štvrtok.

2 Material and methods

Three CES were evaluated (Tab. 1), which were selected according to the Catalog of ecosystem services of Slovakia (Mederly & Černecký 2020). The authors of the publication carried out a pilot evaluation of the selected most relevant ES for the territory of Slovakia. The concept of ecosystem services was defined in relation to material values for production, support and regulatory ecosystem services. Intangible values are mainly associated with CES (Chan et al. 2012). Plieninger (2013) state that several authors define CES as contributions of ecosystems to intangible benefits (capabilities and experiences). CES are less associated with human well-being, but ecosystem and landscape cultural values are irreplaceable (Plieninger 2013). The perception of CES is very individual, for this reason we based our research on socio-cultural methods. When visiting nature, a person does not realize that he is using some CES. He chooses the location of his visit based on whether it contains natural and cultural heritage and whether the location is aesthetically valuable and has its own characteristic appearance. From the above, it follows that CES Natural and Cultural Heritage is what creates the prerequisites for CES Recreation and tourism and CES Landscape Aesthetics (Clemente 2019; **?**; Plieninger 2013; Chan et al. 2012; Daniel et al. 2012).

With our research, we wanted to map the demand for CES in the LAG territory. We hypothesized that the availability and quality of services provided in the field of tourism may have an impact on the level of demand. LAG as an association of municipalities is a grouping of representatives of public and private local socio-economic interests, in which neither public authorities nor any interest group have more than 49 % of voting rights at the decision-making level. LAG has legal personality, according to Act no. 83/1990 Coll. are a citizens´ association. The minimum number of municipalities is seven, the number of inhabitants is 10000−150000 and the population density is not greater than 150 inhabitants/km^2. Since LAG projects are financed from European Union Funds (European Structural and Investment Funds, ESIF) according to European Union Regulation no. 1303/2013, they must be able to manage public funds and manage their activities. The condition for obtaining funding is the development of a CLLD (Community Led Local Development) Strategy based on the LEADER approach (Liaison Actions de Developpement de le Économie Rurale; connecting activities that support rural economic development), i.e. a local development strategy based on the bottom-up principle up. In Slovakia, LAG can become civil associations that are selected by the Ministry of Agriculture and Rural Development of the Slovak Republic on the basis of evaluation of development strategies and are granted LAG status. With this decision, they receive financial support for the implementation of their strategy (www.nsrv.sk).

LAG territory was created in 2015 by the merger of two microregions – White Carpathians and Trenčín Microregion and Bošáčka Microregion. The goal of the association is the cooperation of local entities and the use of external aid

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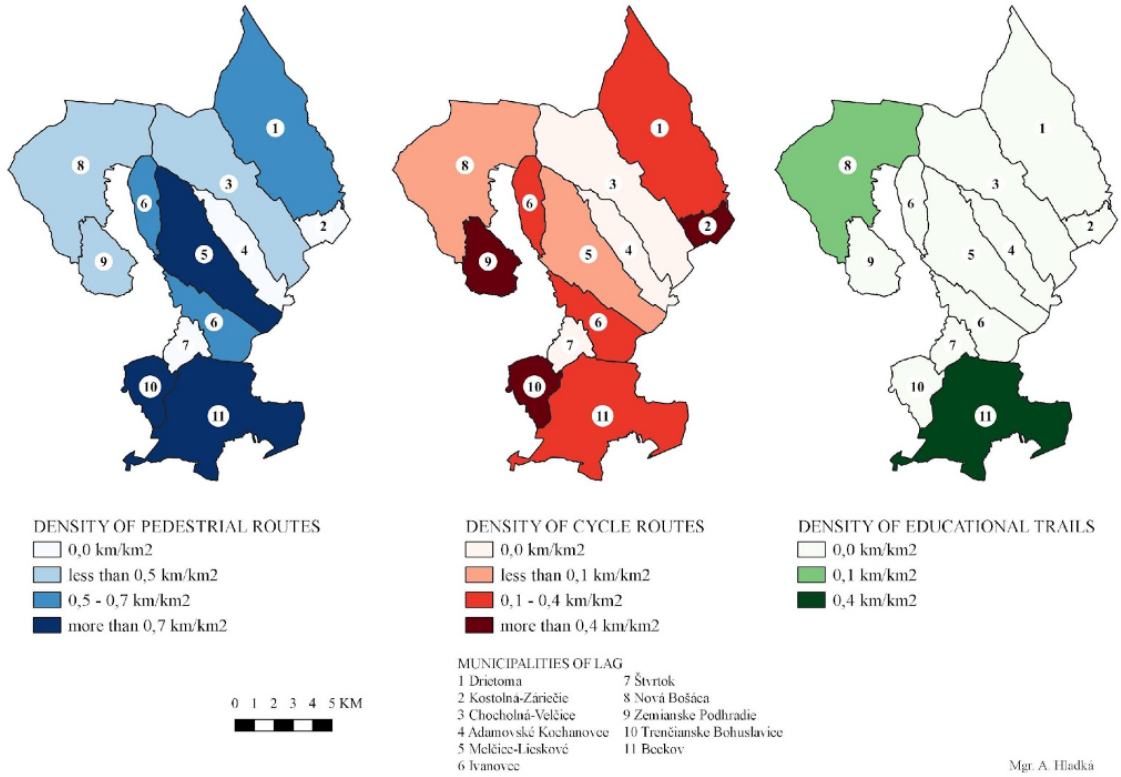

Fig. 2 Density of marked routes and trails in LAG territory (Mapy.cz, Freemap.sk)

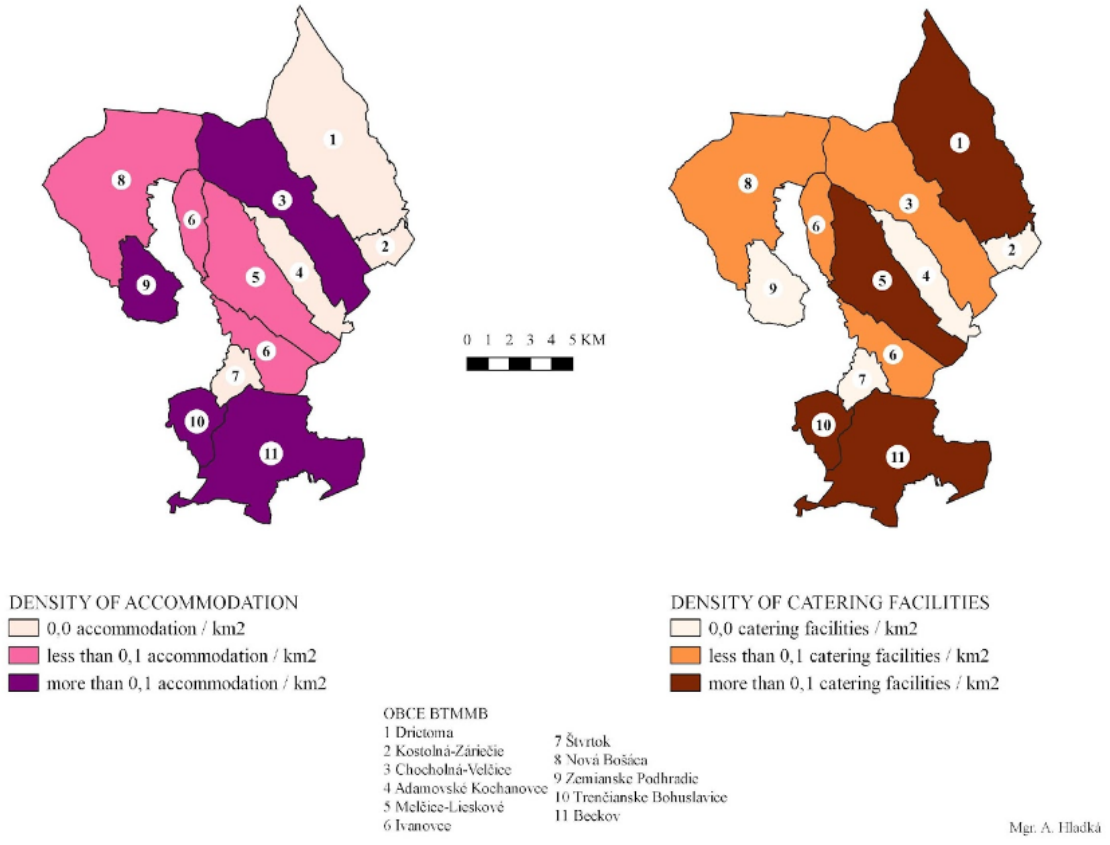

Fig. 3 Density of accommodation and catering facilities in LAG territory (GoogleMaps, Booking.com, MegaUbytovanie.sk)

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Table 1 Definitions of CES (according to Mederly & Černecký 2020)

Cultural ecosystem services	Definitions
Recreation and Tourism: Physical Use of Nature and Landscape	Ecosystems provide an opportunity for spiritual enrichment, mental development and leisure as an intangible benefit related to the presence of people in ecosystems.
Landscape Aesthetics: Aesthetic Values	It is the perception of the aesthetic values of the landscape and its beauty with its characteristic features that distinguish the given landscape from another (characteristic appearance of the landscape). The very perception of the landscape is influenced by the properties of the environment (e.g. climatic conditions, position, dynamics of movement and its distance from the observed scenery).
Natural and Cultural Heritage: Intellectual and Scientific Values	This ecosystem service is associated with the existence of a traditional landscape, which was shaped by a specific relationship between people and nature (e.g. scattered settlements, traditional agriculture, orchards). It is a heritage from the past handed down to future generations, which is represented by natural or cultural heritage (tangible and intangible elements), which are related to each other and their value intersects in several directions.

to contribute in accordance with the CLLD Strategy and in accordance with other development documents of the territory, prepared with the broad participation of entities to support and coordinate the development of the territory and increase the living standards of the inhabitants of the municipalities of the the White Carpathians and Trenčín Microregion and the Bošáčka Microregion (www.btmmb.sk).

We used participatory mapping to collect CES demand data, which was similar to that used by Beichler (2015). Two questionnaires (one for residents and one for visitors to the area) were developed to survey demand for CES. Both questionnaires were divided into three parts. The first part contained basic information about the respondent (residence, age group, gender and occupation). The second part focused on finding out the reason for visits to the area and satisfaction with tourism services. The questions in this part were partly adapted for the given group of respondents. The final part of the questionnaire consisted of the participatory CES demand mapping itself. The assessed CES were selected according to the Catalogue of Ecosystem Services that are relevant for Slovakia (Mederly & Černecký 2020) – CES Recreation and Tourism, CES Landscape Aesthetics and CES Natural and Cultural Heritage. Answers to the last part of the questionnaire were marked on the map of the LAG territory by the respondents. We can say that these are maps of the Gouldian type. Each respondent had one questionnaire with a map, while one questionnaire and the corresponding map were assigned the same identification number. A colour satellite image of the research area with marked borders of individual municipalities was used in the creation of the map. The resulting map had a scale of 1:25 000. Respondents were helped to orient themselves on the map based on their current location and significant points in the landscape (e.g. hill, road and castle). For more accurate localisation, personal notes were recorded in the questionnaire, which were determined by additional questions. It was based on the assumption that the greater the number of responses to a given landscape element on the map, the higher the demand for this element. A sum of responses was calculated for each element recorded. The largest sum represented a value of 100 %, and the shares of the other elements for the given CES were subsequently recalculated from this value. If the element did not appear among the respondents' answers, it means that there is no demand for it within the given CES (0 %).

3 Results

Residents and visitors visit the natural and cultural-historical sites of the LAG territory (Fig. 4a) several times during the year (54.60 %) or have visited them several times (45.00 %). As many as 15.74 % of respondents from the group of residents said that they visit the important LAG area once a year. Some of them claimed during supplementary questions that they had already visited the entire area and there was nowhere new to be seen. Other residents said that they do not have enough time to visit the territory several times a year, or that they want to spend their free time in a place other than the one they are surrounded by every day.

In terms of transport accessibility to the LAG territory, we were interested in the mode of transport used by residents and visitors when moving to or within the LAG territory (Fig. 4b). Transportation by car or motorcycle (59.29 % for residents,

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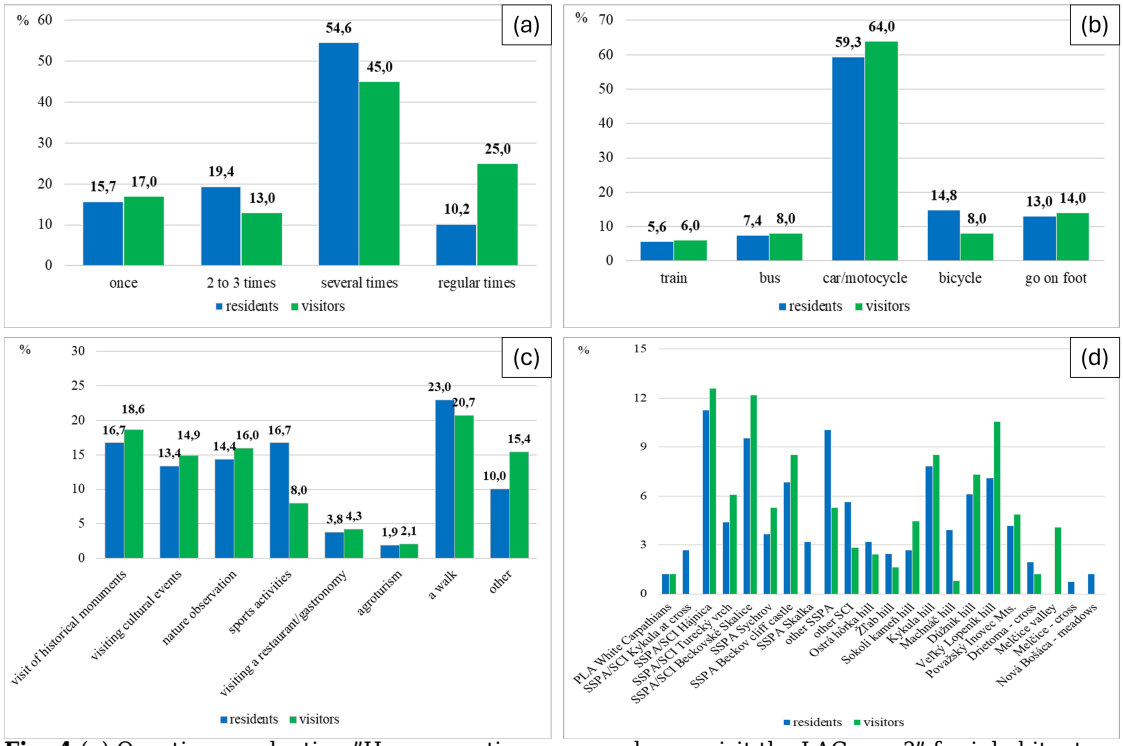

Fig. 4 (a) Questions evaluation ”How many times a year do you visit the LAG area?” for inhabitants and ”How many times have you visited the LAG area?” for visitors. (b) Question evaluation ”What mode of transport did you use to get into and/or in the LAG area?”. (c) Question evaluation ”For what purpose do you go into the LAG area?”. (d) Question evaluation ”What natural attractions or protected areas have you visited?”.

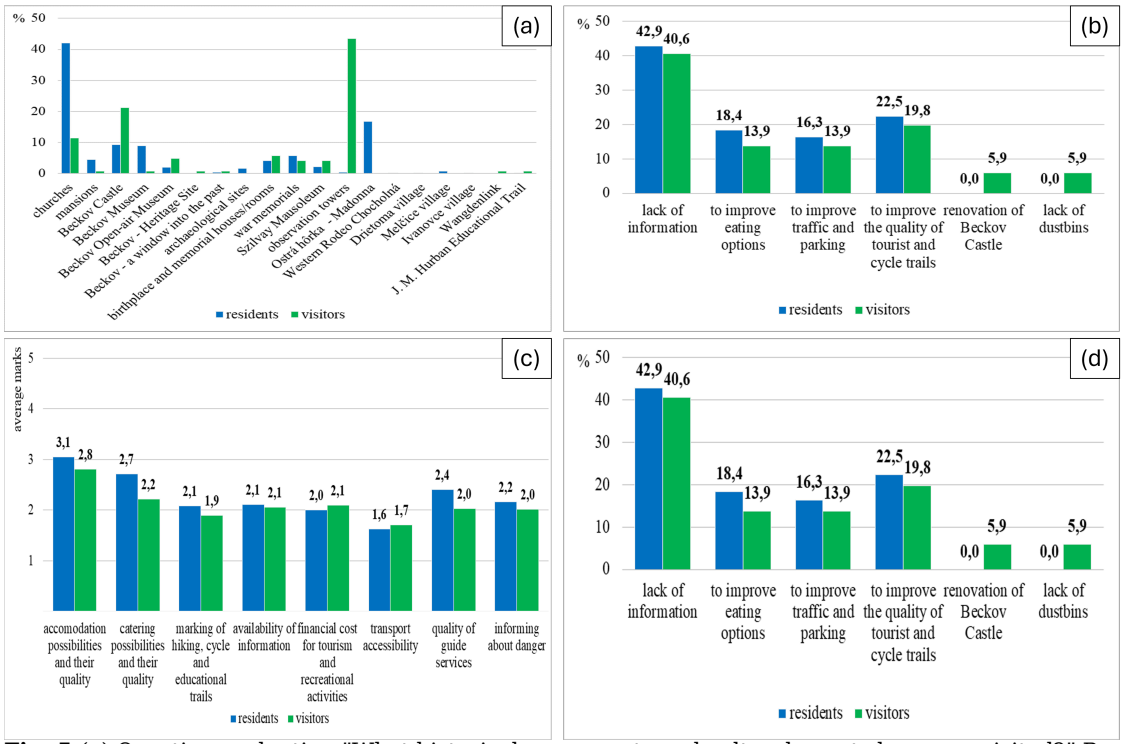

Fig. 5 (a) Question evaluation ”What historical monuments and cultural events have you visited?” Residents and visitors do not feel that nature protection limits their activities in the territory. In both groups of respondents, more than 90 % stated that the presence of protected areas does not limit them at all. (b) Question evaluation ”How satisfied are you with the tourism services in the LAG area?” (c) Question evaluation ”How satisfied are you with the tourism services in the LAG area?”. (d) Question evaluation “What suggestions do you have to improve tourism in the LAG area?”.

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64.00 % for visitors) dominated in both groups of respondents. Both groups of respondents stated that they are satisfied with the comfort and individual layout of the planned journey by car, which can be adapted according to the current situation, as well as better accessibility by car than by public transport. Bicycle transport was used more by residents (14.81 %) than by visitors (8.00 %).

We asked the respondents of both groups about the reason for visiting the LAG territory (Fig. 4c). Both groups of respondents stated that they visit historical monuments and accompanying events that are organised there (e.g. a visit to Beckov castle during the organisation of the Beckov festival, the festival on Hájnica hill, a tourist event in the Bošáca valley – municipalities of Trenčianske Bohuslavice, Zemianske Podhradie, Nová Bošáca). Thus, from the results of the questionnaire we see a combination of several reasons for visiting the territory. Compared to visitors (7.98 %), residents visit the area more because of sports activities (15.77 %). Cycling and biking were also included in the sports activities. Through additional questions, we discovered that visitors are not motivated to use bikes for their sport activities due to undeveloped cycleways and no bike sharing opportunities in this area. When answering additional questions, both groups of respondents agreed that if the destination of their visit is located in the centre of the municipality or in its immediate vicinity (with a suitably arranged access road, or with the possibility of parking a car nearby), they combine their visit with a walk, which they do not consider to be part of the sports activities.

In the next question, we asked respondents what natural attractions or protected areas they had visited (Fig. 4d). From the figure we can see that the most visited by both groups of respondents were small-scale protected areas (SSPA) and sites of community importance (SCI). In addition to the protected areas, the hills are visited most frequently. From the hilltops there is a good view of the region. A low percentage of respondents said that they had visited the protected landscape area (PLA) of the White Carpathians and the Považský Inovec Mts., although many hills and other categories of the listed protected areas are located in their territory.

In response to the question of which cultural and historical monuments the respondents visited (Fig. 5a), the answers are different. Residents most often visited churches in the municipality where they live, or in other LAG municipalities (42.07 %). Their visit was connected with an accompanying event organised in the church (e.g. Night of churches, school excursion). Visitors are most interested in lookout towers (43.44 %). Although lookout towers can be associated with the previous question (a lookout tower that allows to perceive the landscape scenery), in this case it was about visiting cultural events that were organised at the lookout towers.

During the processing of data from the questionnaire (Fig. 5b), we noticed that the respondents perceive insufficient tourism support as an obstacle to the development of the territory, which can be summarised in four categories - lack of accommodation, lack of dining options, transport accessibility (including cycling and hiking) and lack of information.

In the next question, the respondents were asked to rate the service in the field of tourism in the LAG territory. Individual areas were evaluated by the respondents in the same way that students are evaluated in Slovak schools - grade 1 is the best grade and grade 5 is the worst grade. For each service area listed in the questionnaire, an average score was calculated from all responses. In Fig. 5b we can see that both groups of respondents agreed in their assessment of tourism services. In both cases, accommodation options and their quality were rated the worst (grade 3). Residents also rated the options and food quality worse than visitors. Residents rated tourism services with an average grade of 2.29 and visitors with an average grade of 1.94.

The respondents had their own proposals that, in their opinion, would improve tourism in the research area (Fig. 5c). Many proposed their own idea of how they would conceive solving or improving the problems and shortcomings mentioned in the previous questions (Fig. 5d). For a better understanding, we summarised their answers based on common themes into common categories, although they often offered a specific solution to a problem or shortcoming in a certain place (e.g. in which part of the municipality should the restaurant be located). Residents and visitors agreed that information (e.g. regarding sights, events) needs to be improved. For residents, it was mainly about supplementing and expanding the information content, while visitors suggested improving access to information (e.g. a common LAG website showcasing individual attractions, making the specific features of the area more visible). The visitors also made suggestions about the roofing of Beckov Castle and equipping the premises with replicas of period furniture and other exhibits of common use (5.94 %). Visitors miss the rubbish bins at the most visited places (5.94 %).

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Respondents from both groups were mostly people of working life with a high school diploma who worked mainly in services. Their visit to the area lasted one day, but there had already been several visits in a row. Their main mode of transport was mainly by car, to a lesser extent bicycle or they came on foot. The most visited natural attractions are hills with good views, which are reached by marked hiking trails or are located near the municipality. Similarly, the quality of tourism services was assessed and both groups perceived similar shortcomings in tourism development. Both groups visited historical sites and cultural events. Observing nature was also significantly represented among visitors, while residents also sought out sports activities. Visitors mostly visit cultural monuments - lookout towers and Beckov Castle - where cultural events are held.

CES Recreation and Tourism is related to the movement of people in the landscape and the demand for this CES is related to their presence in ecosystems that have an impact on physical and mental health (Mederly 2020). The greatest demand for CES Recreation and Tourism in the area of Beckov Castle, the castle grounds and their immediate surroundings. Fig. 6 shows that both residents and visitors have a great demand for the higher-lying parts of the territory in the White Carpathians and Považský Inovec Mts., while the valley of the Váh River remained almost without demand. Residents focus on the entire mentioned mountain range, while visitors focus on easily accessible hills (e.g. Veľký Lopeník hill, Hájnica hill, Turecký vrch hill). It can also be seen in Fig. 6 that mainly residents use the Vážska cycle highway (No. 002), which runs past the Váh River. Using supplementary questions, we found that residents often use easily accessible scattered settlements for walks and leisurely outings with children, while visitors use scattered settlements for recreation while staying in cottages. Short-term stays dominate in the LAG territory. Most often, the visit lasts for one day. Among the long-term forms of tourism, the LAG territory mainly includes living or recreation in cottages or lodges in scattered settlements. The cottages are used for private recreation by their owners, families and acquaintances but are not available as part of the public offer. In some seasons, they are uninhabited and unused.

The demand for recreation combined with passive relaxation is in the gravel pit Zelená voda locality situated in the southern part of Beckov. Gravel pit Zelená voda was in the past a place of gravel mining in the territory of Nové Mesto nad Váhom and Beckov. The pits that were dug by mining were flooded with groundwater. Currently, swimming in them is allowed at your own risk. While the tourism infrastructure and facilities (restaurants, accommodation, buffets, toboggan) have been built near gravel pit Zelená voda, only a part of the recreation area with a less underdeveloped tourism infrastructure is located in the Beckov locality. Recreational fishermen also have their places along the banks of gravel pit Zelená voda.

The visual quality of landscapes and ecosystems affects people's aesthetic enjoyment of observing nature. CES Landscape Aesthetics significantly affects the realisation of tourism and affects the assignment of moral and spiritual values to the perceived place. The assessment of aesthetic value is based on the link between the material/spatial arrangement of the landscape and people's subjective evaluation (Mederly & Černecký 2020). For CES Landscape Aesthetics, the greatest demand is again in the White Carpathian and Považský Inovec Mts. and in the vicinity of Beckov Castle (Fig. 7). The inhabitants and visitors perceive the hills of Veľký Lopeník hill and Hájnica hill as significant values from the aspect of landscape aesthetics. In Beckov there is also a demand for small-scale protected areas (SSPA) Sychrov and Beckovské skalice. Other locations with high demand are located in the territory of the municipalities of Drietoma and Kostolná-Zárieča. It is interesting that, although with a smaller share of demand, residents and visitors perceive the valley of the Váh River, which is used intensively for agriculture, as an aesthetically valuable area. People appreciated the yellow flowers of oilseed rape (Brassica napus), which is grown here in large block fields and flowers in late spring and early summer.

CES Natural and Cultural Heritage is associated with the existence of a traditional landscape formed by a specific relationship between man and nature. It is a heritage from the past, which is handed down to future generations (Mederly & Černecký 2020). We can see the difference in demand between residents and visitors in Fig. 8. While the highest demand among the inhabitants is in the municipality of Beckov and in the hill - scattered area of Nová Bošáca, visitors would also look for easily accessible hills such as Sokolí kameň hill, Veľký Lopeník hill and Hájnica hill. Similar to Fig. 6, residents have a greater demand for the route of the Vážska cycle route (No. 002), which runs along the Váh River and past large block fields. To a lesser extent, residents have a positive perception of the intensively used agricultural land in the Váh River valley.

The second part of the questionnaire supported and complemented the findings from the participa-

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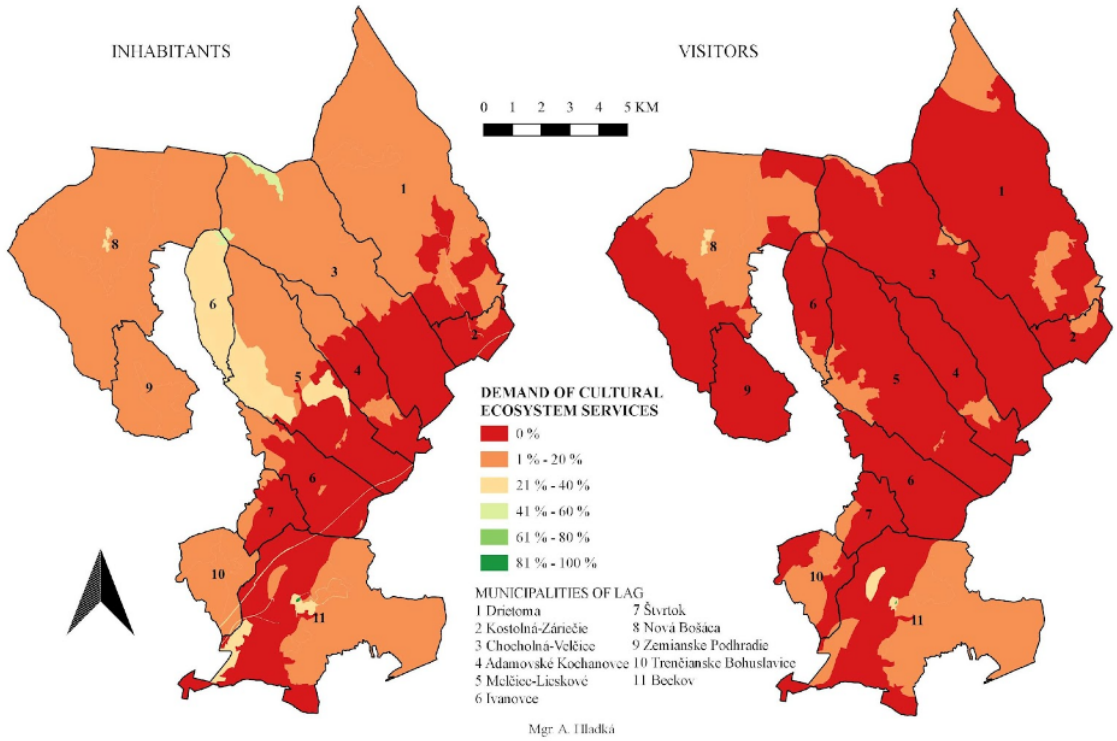

Fig. 6 Demand of CES Recreation and Tourism: Physical Use of Nature and Landscape according to inhabitants and visitors.

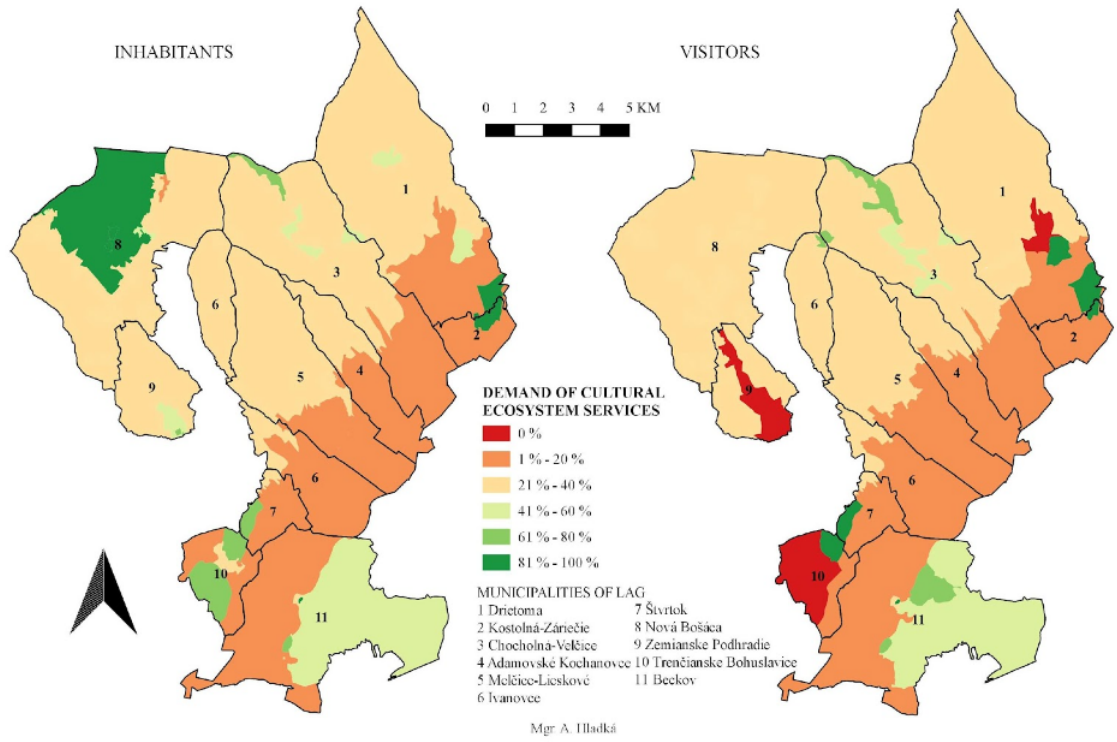

Fig. 7 Demand of CES Landscape Aesthetics: Aesthetic Values according to inhabitants and visitors.

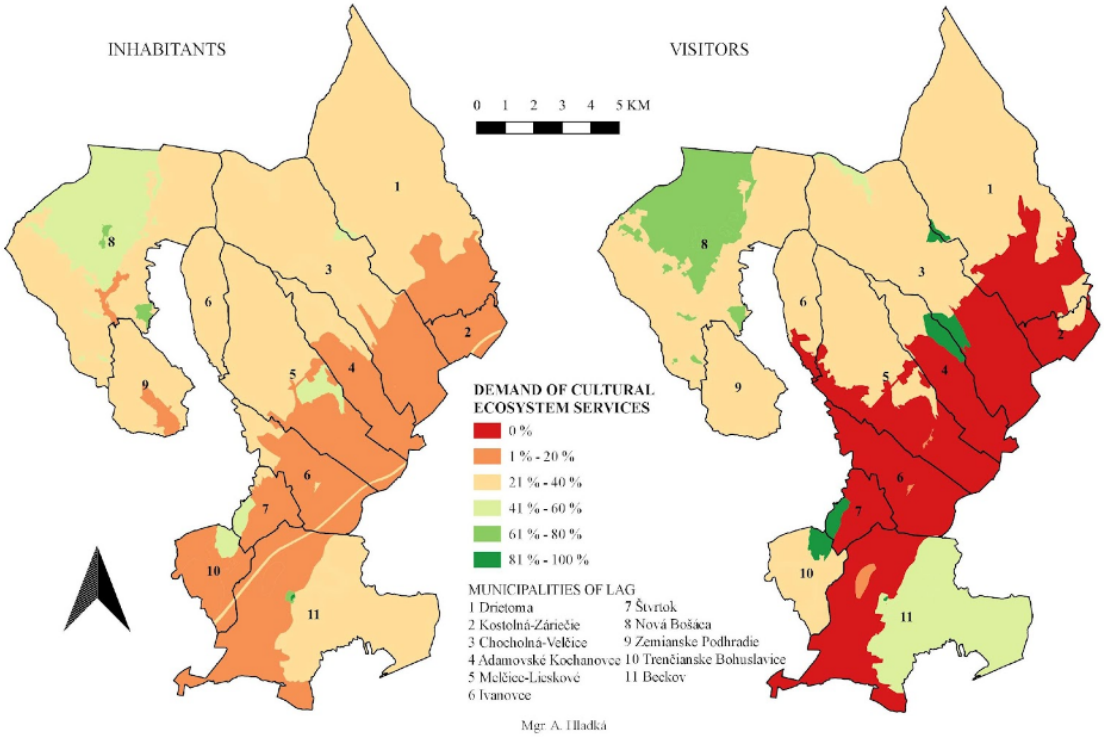

Fig. 8 Demand of CES Natural and Cultural Heritage: Intellectual and Scientific Values according to inhabitants and visitors.

tory mapping. The greatest demand among residents and visitors is to visit Beckov Castle. This visit can be combined with participation in cultural events that are organised here, or with hiking to the Považský Inovec Mts. or a walk in the castle grounds. The Veľký Lopeník hill and Hájnica hill, on which the lookout towers were built, are also visited for a similar purpose. On the way to Veľký Lopeník hill and Kykula hill, the road leads through scattered settlements (Grúň, Machnáč), which both groups highly valued mainly for the character of the landscape, but also as a legacy from their ancestors. In contrast to the visitors, the inhabitants carry out their sports activities in the place of the former gravel pit Zelená voda and the flood dam of the Váh River, which leads to the Vážska cycle route. There is also a higher demand among residents in the Melčický háj locality. As part of the preservation of natural values, visitors visit the Kochanovské vrchy hills site (a forested area between the municipalities of Adamovské Kochanovce and Chocholná-Velčice), despite the fact that no protected area or cultural-historical monument has been declared here. Sokolí kameň hill is popular with visitors because of the view from top.

4 Discussion

Participatory mapping helped us to map areas of CES demand. Until now, participatory mapping was often carried out on city territories and/or their suburbs (Beichler 2015; Ståhle 2013; Pánek 2016; Lehnert 2021). Rural landscape is mapped less frequently (e.g. Brown et al. 2012). Our research has shown that it is possible to carry out participatory CES demand mapping in a territory with a rural settlement (in a part of the territory there is a scattered settlement, which is typical for this region) with an area of more than 190 km^2. The respondents were of different ages and with different educations. Due to the time-consuming nature of the map part of the questionnaire and the impatience or ability to keep their attention, we did not use the Likert scale to assess ES. Instead, we worked with the number of all responses to a given element marked on the map. Beichler (2015) and Daniel et al. (2012) state that some areas may not be precisely defined and localised for a given ES as a result of participatory research. We tried to prevent this by interviewing each respondent individually, including the mapping part of the questionnaire,

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and asking supplementary and explanatory questions.

CES are directly used by residents and visitors to the area. Our research confirmed the findings of Plieninger (2013) that residents associate different CES with different sites, and these may not necessarily be sites of outstanding biodiversity, heritage or scenery. We decided to compare the demand for 3 CES between residents of the territory and visitors, using participatory mapping combined with semi-structured questionnaires. Using the questionnaires, we discovered that there is little or no interest in the monuments of other municipalities such as Beckov. Among such municipalities we can mention Nová Bošáca (World War II battle ground) or Kostolá-Zárieče (Bishop's Palace). Monuments connected with the lives of important people in the municipalities of Zemianske Podhradie (the codifier of the Slovak language Ľ. Štúr, the botanist J. Ľ. Holuby), Chocholná-Velčice (the politician A. Dubček) and Drietoma (the first Slovak professor of geology J. Pettko) deserve more attention amongst the visitors because of their national or international significance. Increasing interest in natural attractions among visitors, as well as residents, could help make the caves in the area of Beckov and Zemianske Podhradie accessible to the public, which are currently not of interest. The castle cliff of Beckov Castle, which is a bypass of the Váh River with an exposed tectonic fault, and the grikes in the Beckovské Skalice Nature Reserve are other geological sites that may be of potential interest to both groups of respondents.

Based on the map outputs, we assume that there are no significant trade-offs between CES because CES overlap within the LAG territory. However, further research is needed to confirm this finding, which is not included in this paper. We recognize that focusing on CES assessment is a limitation because CES are not the only group of ES present in the LAG territory. Further research would be interesting to explore the synergies and trade-offs of CES with production and regulatory ES (Haase et al. 2012; Kandziora 2013).

From our results, we found that visitor demand for CES in the LAG territory is influenced by four factors - accommodation and catering options, transport availability and access to information. Our findings are consistent with Barbu (2013), he cites all 4 factors as important enablers of rural tourism development. The lack of accommodation and catering options does not motivate visitors to extend the length of their stay beyond one day. Inadequate road infrastructure limits people's access to visit sites in the area of interest. Sufficient information associated with the promotion of the territory creates an initial idea for the visitor about the territory and its potential in the field of tourism. Naturally, compared to visitors, residents had more information about the LAG territory, but they often perceived it as insufficient and incomplete. The residents' information was mainly about the most important attractions in the case study area. Accommodation options also had a smaller impact on the demand for CES among this group of respondents. Both groups of respondents agreed that these four factors are the most important in the development of tourism in the area of interest.

When comparing the demand maps of CES Recreation and Tourism, the difference can be seen in that the demand for visitors is concentrated in those locations that are located near accommodation and catering facilities, and at the same time there is a road leading to them, a hiking trails or a cycle routes. On the contrary, residents tend to look for less accessible locations for recreation and tourism, in which visitors have little or no interest, although they also expressed an interest in visiting easily accessible places.

The perception of aesthetic values is highly subjective, yet the respondents agreed that a large share of demand for CES Landscape Aesthetics is in the mountain area. In particular, residents perceived the scattered settlement on the territory of the municipality of Nová Bošáca as aesthetically valuable, while visitors showed little demand for this area (Belčáková 2021). It was surprising for us to discover the demand for this CES in the large block fields area in the Váh River valley, which are considered unsuitable from the point of view of the country's biodiversity, although the demand in this location is at its greatest during the rapeseed flowering period. The demand for this CES in locations where there are buildings of architectural value was only high among visitors in the Beckov Castle surrounds. On the contrary, residents have a greater level of demand even in locations with such buildings in the municipalities of Zemianske Podhradie and Trenčianske Bohuslavice.

On the CES Natural and Cultural Heritage demand a map, it is obvious that there are greater differences in demand among visitors to the territory, while residents have smaller differences in their assessment of demand. In particular, visitors perceive the need to preserve the Považský Inovec Mts. area (on the territory of the Beckov municipality) as part of the natural heritage. The Považský Inovec Mts., unlike the White Carpathians, is not a large-scale protected area, although there are important Euro-

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pean protected sites in this mountain range. Residents have a high demand for that CES in a country that has been heavily reshaped by man. It is an area in the Váh River valley. The residents feel that it would be appropriate to preserve the large block fields, but also the dam between the Váh River and its channel, which has a flood control function, for future generations. Both groups of respondents agreed on the preservation of traditional scattered settlements in the White Carpathians.

5 Conclusion

In our research, we investigated the difference in demand for 2 groups of respondents - residents of the area and people who have visited the area, and how these differences may be influenced. The key factors influencing demand for the site were the number of accommodation services, number of catering services, road networks and tourism infrastructure.

Within CES Recreation and Tourism, the greatest demand is in those locations where there are enough accommodation and catering facilities and easy access to them. Nevertheless, residents are also interested in using an area that would be less frequented by visitors. The great demand for CES Landscape Aesthetics was in the area of the scattered settlements with traditional agriculture, as well as in the valley of the Váh River with large block fields and intensive agriculture. Aesthetic values were associated with the relief of the landscape - the contrast between the valley of the Váh River and the surrounding mountains, as well as with the architecture of the buildings in the municipalities. Similar locations were also highly rated for CES Natural and Cultural Heritage. Both groups of respondents agreed on the need to preserve the traditional scattered settlements in the White Carpathians, as well as the architecture in the municipalities.

The questionnaire section helped to identify what factors are perceived by both residents and visitors as important in the implementation of tourism. Although we would have expected to see more significant differences in CES demand between residents and visitors, our research suggests that CES demand by residents is more evenly distributed across the area than that of the visitor group. For both groups of respondents, hotspots, locations with the highest demand rates, emerged in the same locations.

Participatory mapping allowed us to locate CES demand locations in the area, which can be helpful for further planning of tourism development in the area of interest. Spatial visualization can facilitate ES management, including CES, which would enable a more comprehensive approach in landscape planning and regional land development. The CES demand maps showed us the areas in which visitation is concentrated. Based on being able to assign a location with an identification number using questionnaires, we can predict what activities (forms of tourism) people are planning to do. Based on the results obtained, it is possible to discuss with stakeholders who have an influence on the further development of the area, the practices and measures that could protect and preserve ecosystems capable of providing their services.

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