

**THESES OF THE DOCTORAL
(PhD) DISSERTATION**

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GÖDÖLLŐ
2025**



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EXPLORING REGIONAL DEVELOPMENT ALTERNATIVES BASED ON NATURAL VALUES IN THE BÖRZSÖNY AND CSERHÁT MOUNTAIN RANGES

DOI: 10.54598/006650

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2025

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1. INTRODUCTION

Man has always been part of nature, which has provided him with a habitat and livelihood. Since society relies on natural resources, the conservation of nature is essential for long-term coexistence and sustainability (Kelemen and Pataki 2014). The predominant sites for the conservation and maintenance of nature are rural areas and landscapes (Filepné Kovács 2016). The biodiversity of a landscape and its naturalness are greatly influenced by the type and intensity of agricultural, forestry, game, fish and water management activities (Arany et al. 2017).

Hungary has unique natural values in the Carpathian Basin and in Europe, as evidenced by our national parks, landscape protection areas, nature reserves, ex lege protected areas and values. The conservation of nature in most protected areas is a result of close-to-nature management, as landscapes have been subject to human intervention for centuries (Köster and Denking 2017). Ongoing management is important for sustainability. Our landscapes owe their character to cultivation, so abandoning them would remove the current character of the landscape and thus the aesthetic value it once provided. The different ethnic groups living in different landscapes adapted to their environment and developed different customs, traditions, nature-based farming methods, and made local products and handicrafts from nature. Adapting these now long forgotten or forgotten natural and nature-related values to modern conditions can make the area/landscape attractive to both local people and visitors and strengthen the sense of identity of local people (Monspart-Molnár et al. 2015).

Cultural landscapes express the intertwining of a strong web of culture and identity (Rössler 2006), as evidenced by the persistence and continuous evolution of cultural landscapes (Molnár and Berkes 2018). The strong link between humans and the natural environment is provided by ecosystem services, which play a crucial role in making us feel at home in the landscape (Schaich et al. 2010). Landscapes in Europe have a long, extensive and significant history of human influence, which can be seen as a cultural mosaic (Berkes et al. 2003). Anthropogenic influences at different stages have resulted in a sophisticated multi-layered system. The cultural landscape, therefore, can be understood as a socio-ecological system in which social, economic and natural elements are closely interlinked (Berkes et al. 2003). In many cases, economically and socially disadvantaged areas have natural endowments above the national average (Orosz and Barczy 2019). In order to protect landscapes with a significant natural

and cultural heritage, nature parks have been created in Europe as a collaboration of local communities (Nature Park Network Concept 2021; Kiss 2023). From the perspective of research, the landscape parks, regional or nature parks in Europe are good examples, which have starting to evolve in Hungary as well (Köster and Denkinger 2017; Kiss 2023).

The objectives of my research were:

- C1: Exploration of the natural and related cultural values in the Börzsöny and Cserhát mountains, which are considered important by local stakeholders (mayors, foresters, nature conservation and tourism professionals) and visitors.
- C2: Exploration of natural goods and services (ecosystem services) perceived and used by local stakeholders and visitors in Börzsöny and Cserhát.
- C3: Exploration of development opportunities based on natural and landscape values, local food resources in Börzsöny and Cserhát as perceived by representatives of local stakeholder groups and visitors.
- C4: Exploration of other infrastructure development opportunities in Börzsöny and Cserhát, from the perspective of representatives of local stakeholder groups and visitors, for tourism based on or oriented towards natural and landscape values.

Hypotheses:

- H1: The study areas have natural assets and associated cultural values that represent a potential and can be used for spatial development.
- H2: The perception of local stakeholders and visitors about the goods and services differ between the two study areas due to their different development characteristics.
- H3: The development opportunities and needs based on natural and landscape values, local food resources, as perceived by local stakeholder groups and visitors are similar in Börzsöny and Cserhát.
- H4: Other infrastructure development opportunities and needs related to natural and landscape values or tourism based on natural and landscape values, as perceived by local stakeholder groups and visitors, are similar in Börzsöny and Cserhát.

2. MATERIALS AND METHODS

2.1. Conceptual framework

By creating a conceptual framework, I have positioned the concepts related to the development of areas based on natural values in the triad of nature, tourism and regional development (Figure 1). Tourism is closely linked to nature, since people, especially those living in urban areas, often use natural areas for recreation and relaxation, and become part of tourism as visitors and tourists. Spatial development is based on tourism, nature and other economic and infrastructural elements, but this thesis aims to explore the nature-based sub-elements of spatial development, and therefore I have dealt with the closely related concepts in more detail. I will return to the conceptual framework in the conclusions and proposals section.

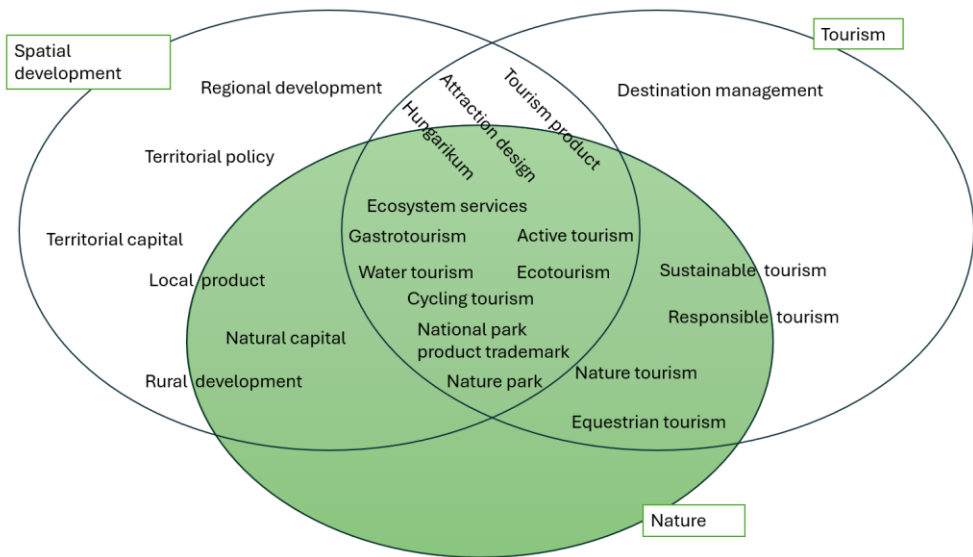


Figure 1: Conceptual framework of the dissertation (by Alexandra Ferencz-Havel)

2.2. Description of the study areas

Börzsöny

I chose the Börzsöny and Cserhát mountains for the research. A large part of the Börzsöny has been a protected landscape area since 1978, and became part of the Duna-Ipoly National Park when it was established in 1997 (Füri 2019). The mountains are part of the Natura 2000 network as a special protection area for birds and a special conservation area under the Habitats Directive. In addition, the Pogány-Rózsás area is a forest reserve (Horváth and Bölöni 2002).

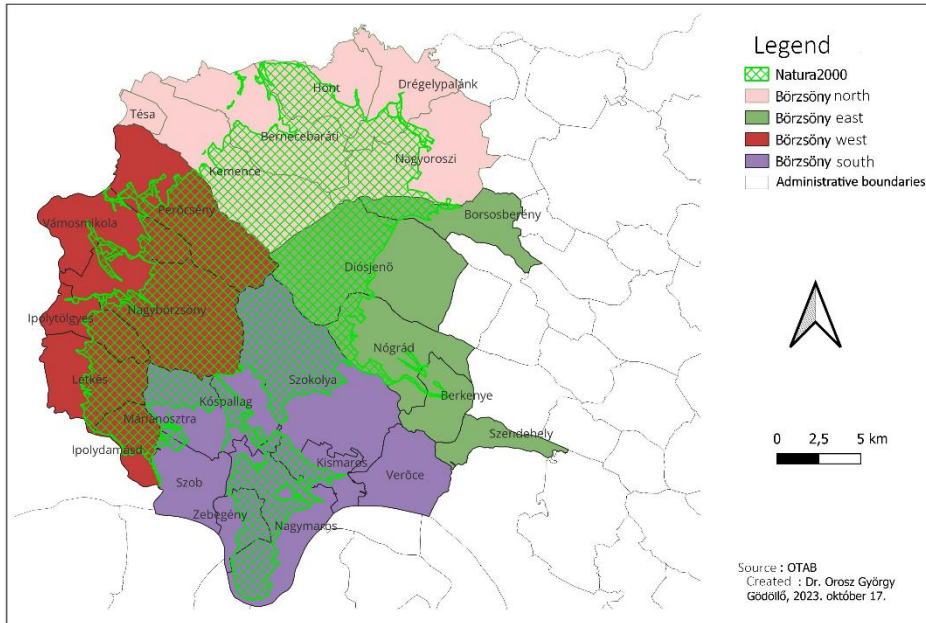


Figure 2: Skyline division of Börzsöny and protected areas (source: based on OTAB, by Dr. György Orosz)

The municipalities I investigated the Börzsöny region (2. Figure 2) include Verőce, Kismaros, Nagymaros, Zebegény, Szob, Márianosztra, Kóspallag, Szokolya, Ipolydamásd, Letkés, Ipolytölgyes, Nagybörzsöny, Vámosmikola, Peröcsény, Tésa, Kemence, Bernecebaráti, Hont, Drégelypalánk, Nagyoroszi, Borsosberény, Diósjenő, Nógrád, Berkenye, Szendehely. The settlements of Börzsöny that I have focused on in my research are located in the Budapest area designated in the NTS 2030. The Börzsöny is the third highest mountain in the country (Dövényi et al. 2010). The Börzsöny owes its wildness to the fact that there are no settlements in the interior of the mountain range, its built-up area is less than 4%, making it the most untouched landscape in the northern part of Hungary (Führer and Kovácsévics 2017b).

Cserhát

The Cserhát is located in the northern part of Hungary between the Börzsöny and the Mátra mountain ranges (Szövényi et al. 2013). The surveyed settlements coincide with the settlements of the Cserhát Nature Park. The name of the Cserhát Nature Park was granted on 22 October 2009 (Professional concept 2013).

Two landscape protection areas and 6 Natura 2000 sites can be found in the Cserhát Nature Park (Harmos et al. 2009; Csorba 2021). The areas of the nature park belong to the Hollókő (1977), the Keleti-Cserhádi (1989) landscape protection areas (Figure 3), and part of the Bükk National Park. The Cserhát Mountains are in fact a hilly landscape, part of the Natura 2000 network, a Special Area of Conservation (SAC) in several sites under the Habitats Directive. The old village of Hollókő and its landscape were inscribed on the World Heritage List by UNESCO in 1987.

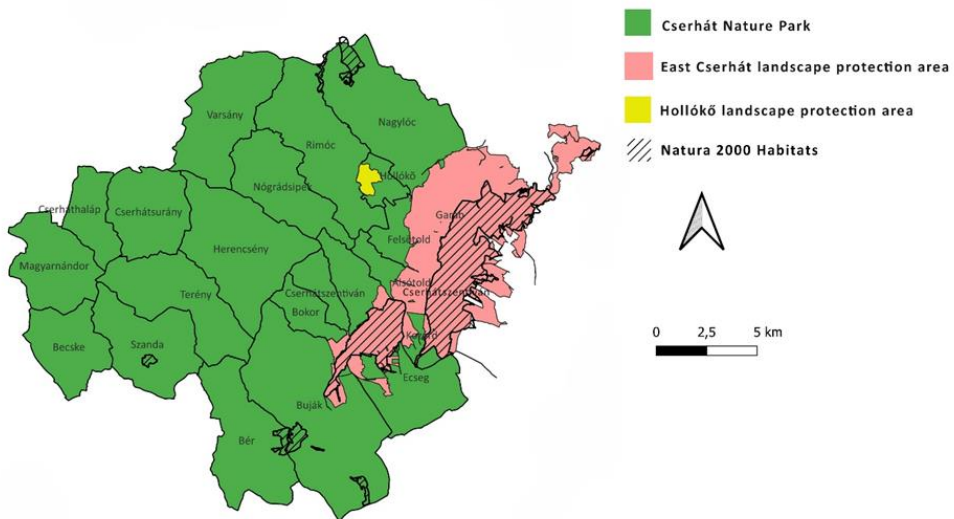


Figure 3: Settlements and protected areas of the Cserhát Nature Park (source: based on OTAB, by Dr. György Orosz)

2.3 Data collection and processing methodology

Interviews

During my research, I interviewed 31 mayors, local professionals involved in nature conservation, tourism and forestry in the Börzsöny and Cserhát mountain ranges. The semi-structured interviews (Newing et al. 2011) were conducted in the Börzsöny in the summer and autumn of 2020 and in the Cserhát in the spring of 2022, with an average time frame of 1-2 hours.

The interviews were recorded using a tape recorder, and verbatim recordings were made. I analysed the texts using qualitative content analysis based on the pre-defined codes associated with the questions using the QCAmap software (Patton 2002). In an Excel spreadsheet, I collected separately the quotations and text passages related to natural values and development opportunities. I used quotes from these study areas that were suitable to illustrate the results. In order to protect personal data, I have labelled the interviewees after the quotes with a code, the first part of which indicates the study area (B-Börzsöny, CS-Cserhát) and the stakeholder group they belonged to (P-Mayor, E-Forester, TU-Tourism Specialist, TV-Nature Conservation Specialist), and the number after that indicates their rank in the list (e.g. BTU1, BP1, BTV1, BE1).

Questionnaires

For my research, I chose a web-based online questionnaire form, which was created with the online program limesurvey.org. The target group of the questionnaire was hikers. I created two questionnaires for the two study areas, these had similar questions for comparability, but I also included area-specific questions in both questionnaires. I divided the questionnaires into the same four broad units: 1. visiting habits, 2. nature and landscape, 3. development needs, and 4. demographics. I posted the questionnaires on social media, Facebook, targeting groups with activity relevant to the topic. The questionnaire related to Börzsöny was distributed between November 2021 and January 2022, the one on Cserhát between October 2023 and March 2024. A total of 264 people completed the two questionnaires, 129 for the Börzsöny and 135 for the Cserhát. The responses were exported to an Excel spreadsheet, cleaned and coded, and analysed using IBM SPSS Statistics version 29.0 with statistical methods (frequency, percentage distribution Chi² test, Fisher exact test).

3. RESULTS AND DISCUSSION

3.1. Natural goods and services perceived by visitors and local stakeholders

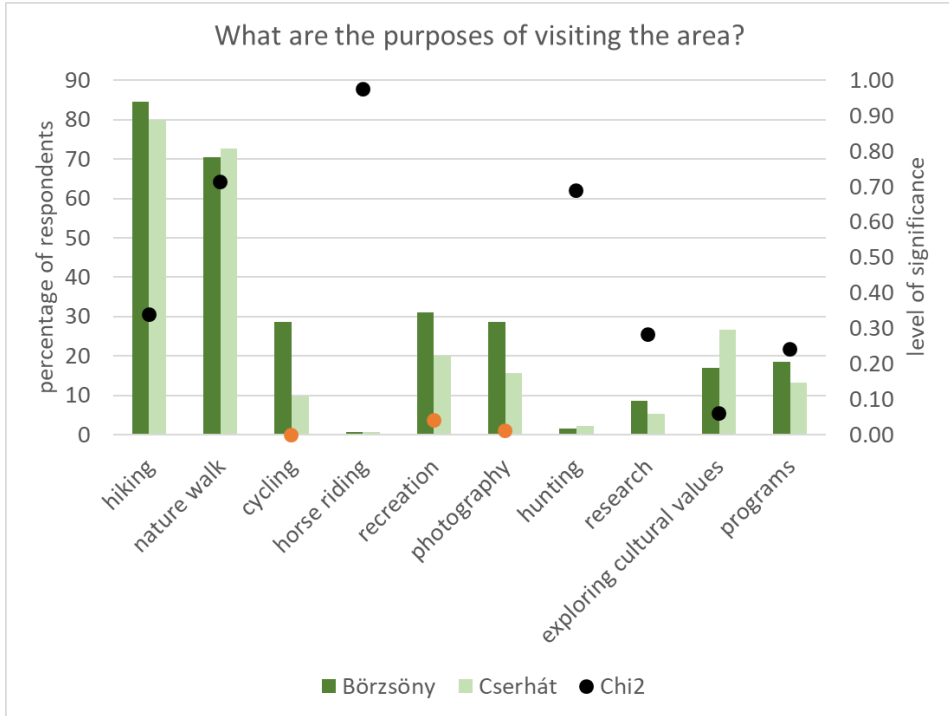


Figure 4: Main objectives for visiting the Börzsöny and Cserhát (percentage of respondents and Chi² test significance level). Multiple answers were possible, so each objective represents a separate variable. Orange circles indicate a significant correlation between place-colour and visit goals ($p < 0.05$). (by Alexandra Ferencz-Havel)

A significant percentage of respondents visit both study areas for hiking (B:85%; Cs:80%) and trekking (B:71%; Cs:73%) (Figure 4). The main attraction of the mountain areas is time spent in nature, which was reported by one interviewee in the Cserhát as below. *"I think we are in a special natural environment, I think, because everywhere you go there is a different composition of nature, trees, plants. It's an opportunity to be able to get out here and to be able to hike, to be able to have good hiking in our area, and that's why I said it would be very important to be able to develop even more and more hiking trails."* (CSP3)

In addition to the main purposes, nearly 30% of the respondents of the Börzsöny site come for cycling, recreation and photography. Almost 30% of

respondents come to Börzsöny for photography, thanks to the unparalleled panoramic views of the Danube Bend and the numerous thematic photo opportunities. In the Cserhát, 16% of the respondents come for photography, a figure which may be lower because the landscape is varied but does not offer the same panoramic experience as Börzsöny. Recreation and leisure opportunities also tend to be more developed in Börzsöny, with more tourist attractions in the area than in Cserhát. *"Relaxation, recreation. I think it's a beautiful countryside, if you think about what you see here."* (CSE1) *"I think it gives a sense of calmness, a chance to relax. I also really like walking in the woods or walking in nature."* (CSP1) *"The good air, the birdsong, the chance to relax, recreation, revitalization for anyone who comes here, whether for a shorter or longer period of time."*(BTV1)

3.2. Ideas for tourism development based on the presentation of natural and landscape values and natural assets

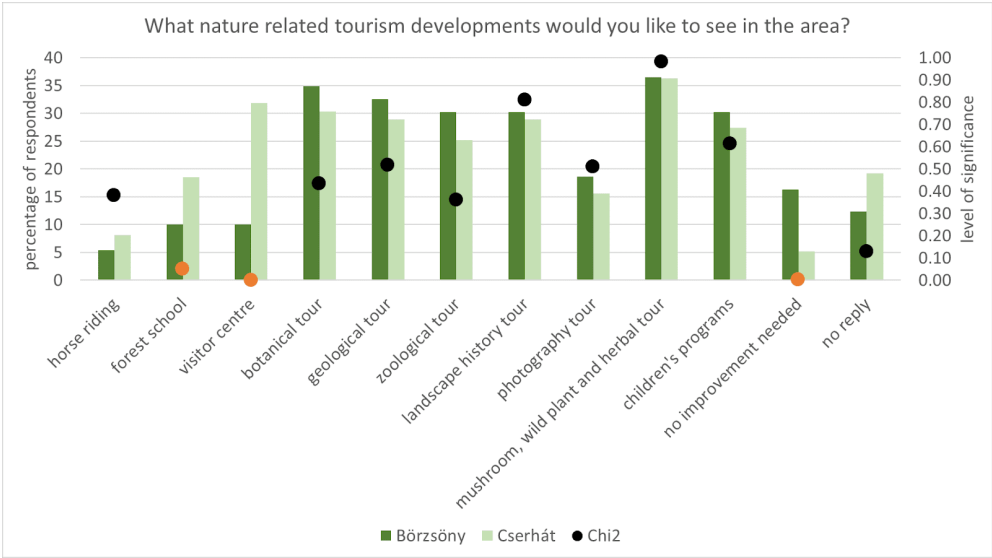


Figure 5: Respondents' needs for nature-related tourism development (percentage of respondents and Chi² test significance level). Multiple responses were possible, so each nature-related tourism development is a separate variable. Orange circles indicate a significant correlation between the locations and the tourism development ($p < 0.05$). (by Alexandra Ferencz-Havel)

During the research, I also sought answers to the question of what professional programmes (Figure 5) and development directions respondents visit-

ing the area would like to see. It can be seen that there is a significant association between forest school and site. In the Cserhát (19%), 9% more respondents would like to see forest school development than in Börzsöny (10%), the reason being that there are only two forest schools in the Cserhát. The significant association between the visitor centre and the locations also stands out. In Börzsöny there are several visitor centres and forest leisure centres, while in Cserhát there is no visitor centre or similar nature-tourism reception building suitable for larger groups. *"So what I am saying is that it could be done in Hollókő if the county and Hollókő got behind it. We don't have a student residence, we don't have a place when groups of kids arrive [we can host], we don't have a welcome centre."* (CSTU1) In both study areas, the herbal knowledge tour stands out, with 36% of respondents expressing a need for this, and this was confirmed by interviewees, but few such tours are held in the study areas. *"A lot of people go out into the woods to go mushrooming. To collect other things less so, but I think also with the people who have moved in, the culture of herbalism, the culture of collecting berries, has started. They are opening up to knowledge that they may have traditionally had a very long time ago, but which has been lost in the last decades because of lifestyle, and is now coming back. It is possible to take small courses, there is usually a basic training in mushroom knowledge, tours on medicinal plants."* (BTU1) Other thematic tours (e.g. botanical, geological) were also mentioned by respondents, with a lower percentage (35-25%), but our interviewees also consider it important to have guided tours in the area. In both regions, interviewees mentioned that it would be worthwhile to organise guided tours with thematic knowledge, with species related tours being suggested in Börzsöny and geological tours in Cserhát. *"The rare protected plant species, because they are surrounded by forests, and the animals are obviously also important inhabitants here, so it would be easy to hold guided thematic tours led by an expert."* (BP4) *"So the Cserhát was previously known mainly for its geological values. Simply because geologists moved around in the area, but wildlife researchers hardly ever did. So there are several natural excavations of geological value, rock sedimentary strata, and mainly artificial excavations, i.e. mainly quarries, road gullies, which are considered natural values."* (CSTV1)

Table 1: Tourism development opportunities based on the natural values mentioned by the interviewees in Börzsöny and Cserhát (by Alexandra Ferencz-Havel)

	Börzsöny	Common	Cserhát
Natural tourism	<ul style="list-style-type: none"> • creation of a walking path around the village, • herb garden with walks, • geological demonstration site in abandoned mines, • creation of a walking path around the castle and the lake in Nógrád, 	<ul style="list-style-type: none"> • creation of thematic tourist routes, • creation of nature trails, hiking circuits, night hiking trails, • development of hiking trails, • creation of organisations for the maintenance of hiking trails, 	<ul style="list-style-type: none"> • improvement of the painting of green trails, creation of new ones, • creation of hiking trails in Varsány, • increasing the number of educational trails in Hollókő,
Cycling tourism		<ul style="list-style-type: none"> • designation and creation of a network of cycle touring routes, 	<ul style="list-style-type: none"> • creation of cycle paths
Equestrian tourism	<ul style="list-style-type: none"> • creation of an equestrian centre, horse riding facilities, • development of equestrian tourism, • demonstration of animal husbandry, creation of a petting zoo, 	<ul style="list-style-type: none"> • designation and creation of horse riding trails 	

	Börzsöny	Common	Cserhát
Water tourism	<ul style="list-style-type: none"> • launching water tourism, • canoe trips on the Ipoly river, • fishing on the Ipoly river, • rehabilitation of the fishing pond, 		
Attractiveness, service development	<ul style="list-style-type: none"> • a village tour based on a free-standing room scheme, • the realisation of an adventure valley, • presentation of sacral sites and their monuments in the forest, 	<ul style="list-style-type: none"> • guiding tours, holding nature walks, • creating a lookout point, a sanctuary in the forest, 	<ul style="list-style-type: none"> • identification of highlighted natural values as a target, • designation of landart points along the greenways, • making mines accessible to visitors, giving them new functions, • renovation of the Dobogó-tető lookout tower, • improving the state of the Sasbérc lookout tower,

The mountain areas differ in terms of their tourism development, which is why not all groups have been included in the development potential (Table 1).

The Börzsöny is clearly more developed in terms of tourism than the Cserhát, and therefore the development opportunities are also different. Development opportunities for hiking and cycling tourism are more settlement-

specific in Börzsöny, while in Cserhát there are also settlement-specific and mountain-wide developments (e.g. development of cycle paths). Common development opportunities include the development of nature trails, thematic tourist routes, hiking and cycling routes. Of these, the emphasis in the Cserhát is more on development, while in the Börzsöny it is on development in some places, but more on upgrading. In Börzsöny, for example, one interviewee suggested a nature trail around the village, with guided tours. *"I think there would be value in having a trail around the village or several smaller trails and then presenting the natural, cultural and other values there. It could be thematic, with a guided person coming and doing it. There are people in the municipality who could do this, but it hasn't been organised yet, we haven't found a way of doing it, and there are no resources."* (BP4)

The development and implementation of equestrian and water tourism is more typical of Börzsöny. Water tourism is still in its infancy in the villages along the Ipoly river, which is why it is necessary to develop canoeing and fishing tourism. The development of equestrian tourism and the creation of various services have been raised by the inhabitants of Börzsöny, but only the development of horse riding trails has been included in the common category, because the greenways in the Cserhát are suitable for horse riding trails, but there is still room for expansion in the region. I have included the creation of a petting zoo with a focus on the presentation of domestic animals in this category.

I have identified the category of attraction development and service development, which includes development opportunities that offer more experiences and outstanding value in the area of development and that could create multi-day tourism and more complex excursions in the area. In the development of services, the interviewees mentioned the presentation of sacral sites in the Börzsöny forest, and the development of specific lookout points such as Dobogó-Kő and Sasbérc in the Cserhát. In addition, the modernisation and creation of lookout points and rest areas in both study areas would be important, and guided nature tours were also mentioned by the interviewees.

Another possibility is to set up a village tour on the model of a recreation room, such as the village tour called Kalandió in Diósjenő. At the time of the interview, the programme was still in the planning stage, but has since been implemented. *"We are developing a game called Escape room on the initiative of the citizens. This is meant in a figurative sense, because it's not a room, it's a playful task, through which the attractions of the village are*

shown, and small groups are given two to three or four hours of activity, because everyone loves to play." (BP8)

Two similar development opportunities appear in the Cserhát, the creation of landart points along greenways, by which one should mean a particular outstanding natural or landscape value. These landmarks would attract more people to the area through their history and appearance, which would give a slight boost to tourism in the Cserhát. *"In fact, we wanted to have such landmarks along the greenway. Something like the Hand Lookout, so not exactly like that, but more simple, but the point is attract you to go on a trip, to give you something extra where you can take photos or have a nice view or something like that."* (CSTU1)

3.3. Other infrastructural developments affecting or targeting tourism in natural areas

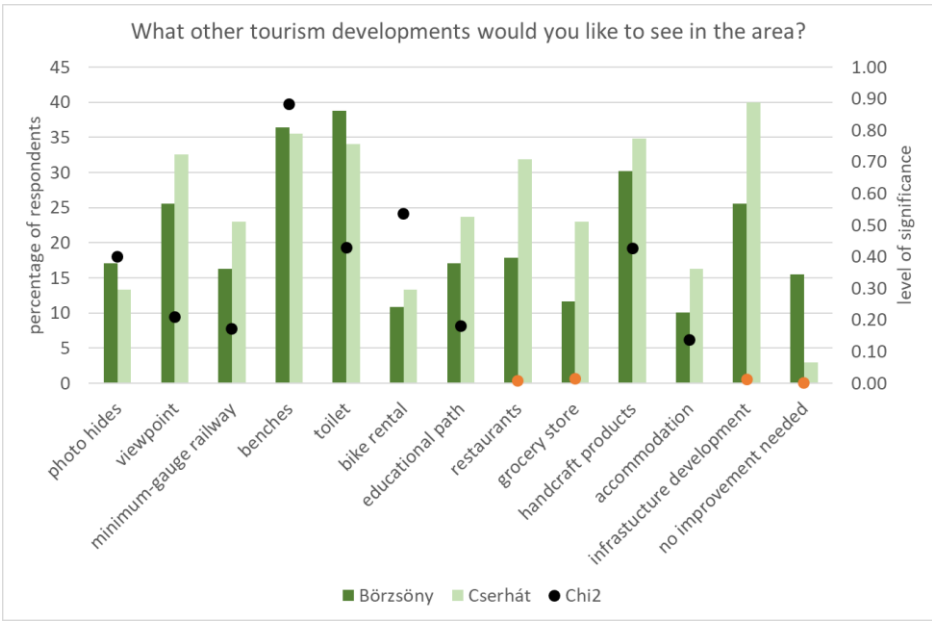


Figure 6: Respondents' needs for other tourism development opportunities (percentage of respondents and Chi² test significance level). Multiple responses were possible, so each tourism development is a separate variable. Orange circles indicate a significant correlation between the locations and the tourism development ($p < 0.05$). (by Alexandra Ferencz-Havel)

The other tourism development needs of the two study areas show some similarities and more differences (Figure 6). There is a significant association between the locations and four categories (infrastructure development, catering facilities, convenience store, no development needed). For restaurants

(B:18%; Cs:32%) and shops (B:12%; Cs:23%), 14% and 11% more Cherkhat respondents respectively mentioned the need to improve services. Unfortunately, many villages in Cserhát do not have a grocery shop and most of the villages with a larger population do not have a restaurant. There is also a significant association between infrastructure development (B:26%; Cs:40%) and location, with respondents indicating a much greater need for infrastructure development in the Cserhát, where the condition of roads is very poor and public transport frequency and journey times need improvement. There is also a significant association between location and the category of no need for improvement. 16% of the respondents to the Börzsöny questionnaire said that there is no need for improvement in the area, thus confirming that the municipalities in Börzsöny are more developed. In both study areas, respondents wanted an increase in the number of benches (B:36%; Cs:36%) and toilets (B:39%; Cs:34%) as important improvements, but this did not show a statistically significant association between categories and locations.

Table 2: Other infrastructure development opportunities in Börzsöny and Cserhát mentioned by the interviewees that affect natural values or tourism in Börzsöny and Cserhát (asterisks indicate developments with a potential negative impact on nature) (by Alexandra Ferencz-Havel)

Börzsöny	Common	Cserhát
<ul style="list-style-type: none"> • the creation of canoe-kayak rental sites, • the creation of ports, the expansion of nautical services*, • development of beaches, • development of the M2 motorway to the border*, • a dignified environment for the Chapel of the Sondas, • turning the shooting range into a museum and hiking accommodation, 	<ul style="list-style-type: none"> • improving public transport (affordable, fast, convenient), • improving the state of the road network, • parking spaces*, • network of cycle paths, with rental and service network (development of cycle paths with links to the highlands, development of separate cycle paths along main roads, busy roads), • rain shelters, wooden bridges over streams, benches, maintenance of tourist paths, 	<ul style="list-style-type: none"> • a visitor centre in the area, • small businesses or family farms adapted to or respecting nature, e.g. organic farming, livestock breeding, • incubator house for small businesses, • establishment of catering facilities; • small and large-scale accommodation; • improving the quality, facilities, comfort and quantity of

Börzsöny	Common	Cserhát
<ul style="list-style-type: none"> • development of accommodation and service functions • development of accommodation facilities in small pools • bicycle hire at railway stations, • cycle path from the railway station to the excursion sites, • purchase of an electric minibus, • renovation of the castle, • development of a local covered market in Nógrád, • construction of a funicular*, • creating an adventure park*, 	<ul style="list-style-type: none"> • more environmentally sensitive management of municipal waste, 	<ul style="list-style-type: none"> existing accommodation; • establishing a guest house in Varsány; • creation of a house of local traditions in Nógrádsipek, • creation of a sledging track with artificial snow (Hollókő)*, • wood processing sawmill on site, • possibility of developing industrial sites; • development of public transport, rail network; • development of accessible roads and pavements; • sewage treatment facilities in Alsótold

Common development objectives

There is room for improvement in infrastructure in both study areas (e.g. improving road quality, increasing public transport frequency), but nature and its preservation should not be forgotten. *"Well, I would see two things that would be very important, one is to improve accessibility, i.e. road quality. To get in and out of the area quickly, even by public transport."* (BP2) *"Improving public transport, affordable, fast, clean, convenient public transport, because it's the basis of everything, getting to work, entertainment, relaxation, shopping, keeping in touch. Transport is the basis of everything, if it's good everything works better, if it's lousy everything works much harder."* (BTV1)

Several options for improving the cycle path network have been identified, the first and most important being the development of a single cycle path network

around the mountain with service points and associated service units. The development of a network of touring cycle paths and the construction of cycle paths and links to cycle paths in the Highlands was also considered. *"Let's have a regional cycle path network with a bike rental system where local services are integrated, where this is coordinated with local hosts, where there is really technical content and marketing behind it, so that the service provider can also support, for example, the bike service."* (BTU1) *"A well thought-out cycle path network for the whole large region with links to Slovakia, including links to the Highlands, and a network of cycle paths and touring routes."* (BE2)

Börzsöny

According to representatives of local stakeholder groups, the Ipoly River is becoming increasingly attractive for canoeists and kayakers, but the lack of adequate ports and rental facilities means that this service is not fully developed. In addition, there is a need to develop ports and to renew and extend the boat services in the municipalities along the Danube. In addition to the creation of places to hire watercraft, the establishment of a transfer service along the Ipoly is also essential. It was suggested that information boards could be placed along the river banks, so that canoeists could look at them while paddling, as a kind of nature trail, and take a rest. *"In fact, the number of active sportsmen and women is constantly increasing. Both on water and on land, there is a need to develop infrastructure, to build cycle paths, moorings. I could envisage slow cruise boat, shipping services."* (BP5)

Cserhát

Several mayors and professionals mentioned the possibilities for developing accommodation, one of which was the development of small and large accommodation facilities to welcome groups. There is no accommodation in the Cserhát that can accommodate large groups, which the mayors are well aware of, and they therefore urge its development. *"So what I see now, and so it would be important from a tourism point of view. Maybe one or two accommodations in Magyarnándor would be good, but I prefer to think of such a large number of accommodations"* (CSP5). The possibility of further developing the Rozmaring restaurant would be to build a guest house, which would increase the number of accommodation options. *"Everything that we produce in the village goes into the restaurant and we can serve our guests very tasty,*

fresh local food. And, of course, we have goals to build a guesthouse on top of that." (CSP3)

Just as the processing plant had been mentioned earlier, other community leaders also raised the idea of creating a plant adapted to local conditions, which would generate profits locally. *"The only way to think here is agriculture, which is livestock farming. If a sawmill could be run locally, which a good businessman would have done a long time ago. The wood would be delivered processed, not in logs as it is now."* (CSP8)

4. CONCLUSIONS AND RECOMMENDATIONS

4.1. Conclusions

My first hypothesis was that the study areas have natural values and related cultural values that represent a potential for regional development and can be used in regional development. Based on the interviews, the two mountain ranges show similarities in natural values. There are a number of values that could be developed in the future (e.g. geological formations), for which thematic hiking trails and guided tours could be planned. Two thirds of respondents (B:75%; Cs:67%) consider the condition of the natural assets in both study areas to be good or very good. Interviewees' responses were positive in the case of Börzsöny, where they rated the state of nature as good, but were divided on the condition of the Cserhát.

Based on my results, my hypothesis (H1) holds true, i.e. the study areas have natural values and related cultural values that are recognised by local stakeholder groups and that can be applied in regional development.

My second hypothesis (H2) was that the nature goods and services perceived by local stakeholder groups and visitors in the two study areas differ due to their different developmental characteristics. The questionnaire respondents mainly visit Börzsöny and Cserhát for hiking (B:85%; Cs:80%) and trekking (B:71%; Cs:73%). In the Cserhát, a significant number of respondents come to explore cultural values (27%), due to the attraction of Hollókő. Hiking provides a number of well-being and ecosystem services through nature, with over 60% of both study areas mentioning relaxation, recharging and peace and quiet. The Börzsöny was chosen by respondents for its good air (65%), easy access (45%) and pleasant climate (32%), while the Cserhát was chosen for its good air (37%), low tourist traffic (34%) and cultural values (29%).

My hypothesis (H2) is partially confirmed by the results, as there are some nature goods and services that are present in both study areas (e.g. good air, recharging). However, there are several nature goods and services that are dominant in Börzsöny (e.g. cycling, pleasant climate) and were selected by only a small percentage of respondents from the Cserhát. The Cserhát is outstanding in terms of cultural values, while this is less the case in Börzsöny.

My third hypothesis (H3) was that the development opportunities and needs based on natural and landscape values, local food ingredients, as perceived by local stakeholder groups and visitors, are similar in Börzsöny and Cserhát. In both study areas, more than 25% of the respondents to the questionnaire mentioned different guided tours to broaden their knowledge, which several of the interviewees mentioned and which they would like to implement in the future. Among the professional tourism developments, a visitor centre stands out in the case of the Cserhát, which over 30% of the respondents would like to see in the area and this was confirmed by the interviewees, as there is no visitor centre in the settlements I surveyed. In the case of Börzsöny, several small-scale developments were mentioned (e.g. stimulation of equestrian tourism, introduction of guided tours on the Ipoly river), while in the case of Cserhát, larger-scale developments would be needed (e.g. designation of landmark points and priority natural values). Common development objectives include the creation of guided tours, designation of a network of hiking and cycling trails, although the scale of these developments may differ depending on the characteristics of the two study areas.

In both study areas they see potential in agriculture and its various branches, in Börzsöny fruit growing is the potential, in Cserhát they see development in small-scale agriculture and family farming. In the context of the local product and gastronomic potential of Börzsöny, various ideas were suggested for the revival and development of the former berry fruit cultivation. In the Cserhát, they mentioned family farms and farms, and in the long term they would build on the processing and storage of the vegetables grown and the mushrooms and plants provided by nature.

My hypothesis (H3) is that the development opportunities and needs based on natural and landscape values, local food ingredients, as perceived by local stakeholder groups and visitors, are partly similar in the two study areas. Different types of development ideas have emerged in the study areas due to the history and vegetation cover of the two study areas, but the local processing of local products is present in both mountains.

My fourth hypothesis (C4) focused on other tourism and infrastructure opportunities for both visitors and local stakeholders. Among the other tourism developments, a high number of respondents (40%) mentioned infrastructure development in the case of the Cserhát, mainly due to the underdevelopment and difficult accessibility of the area. In Börzsöny, the answers were more focused on the improvement of services related to hiking (e.g. benches, toilets). In Börzsöny, there is a need for the development of bicycle hire points, ideally located close to the railway station so that visitors can easily use them. In the Cserhát, the need is for more far-reaching improvements (e.g. creation of a visitor centre, incubator house for businesses). The common category was for improvements to public transport and the development of a cycle path network.

My hypothesis (H4) that other infrastructure development opportunities and needs for tourism to natural and landscape values, perceived by local stakeholder groups and visitors, are similar in Börzsöny and Cserhát, holds partially. There are similar development opportunities in both study areas, but rather settlement and area-specific ideas dominate the study areas.

4.2. Recommendations

My first and most important suggestion is to prepare a development strategy for both study areas, based on the natural and related cultural values, combining the suggestions of the stakeholder groups who live in the area and those who visit the mountains. The involvement of the groups concerned in the development of development concepts will help to avoid conflicts.

The development of a network of cycle paths in both mountain ranges would also represent a significant tourism potential. There are already cycle paths on the western (Danube Bend) and northern side of the Börzsöny, but it is proposed to extend them. In the case of the Börzsöny, it would be important to develop a cycle route around the mountain with appropriate bicycle services and rental facilities. A cycle path on the hills of the Cserhát would provide cycling opportunities for another group of tourists, mainly families.

A significant proportion of visitors come to the mountain areas for hiking and excursions, and it is therefore worth considering the professional and infrastructural development needs they suggest (e.g. thematic guided tours, pad-docks), some of which were also suggested by local interviewees (e.g. guided tours).

I propose the restoration of traditional farming in the Cserhát, as the landscape has been shaped by the presence of animals and this would ensure the

long-term preservation of the landscape. In addition, traditional farming would provide value and a livelihood for the local population.

As a further research option, I propose to conduct focus group discussions in the two study areas to validate the development ideas collected.

5. NEW SCIENTIFIC RESULTS

1. **I conducted the first natural values-based questionnaire survey among the visitors of the Cserhát on the natural values, development opportunities and visiting habits of the Cserhát.**
2. **I explored the natural assets and services that visitors to Börzsöny and Cserhát consider important and use.** I found that the visitors who filled in the questionnaire prefer the tranquillity of the forests in the Börzsöny mountains and in the Cserhát mountains, which is situated among the calming hills. The visitors who filled in the questionnaire come to both study areas for hiking (B:85%; Cs:80%) and trekking (B:71%; Cs:73%) and the Chi² test showed no significant difference between the two study areas ($p < 0.05$). For visitors completing the questionnaire in both study areas, hiking provides recreation, exercise, and recharge, all of which are considered cultural ecosystem services, and there was no significant difference between the two study areas based on the Chi² test ($p < 0.05$).
3. **I explored what natural, landscape and cultural values are considered important by the local stakeholder groups of Börzsöny and Cserhát and the visitors who filled in the questionnaire, and how they judge the state of the natural values and compared them.** I found that local stakeholder groups mentioned more specific sites of natural values (e.g. Csarna Valley, Csitári Spring) and cultural values related to nature in Börzsöny (e.g. Nógrád Castle, Apródok útja nature trail) than in Cserhát (e.g. Rézparti Reservoir, Béri Stone Tower, Sasbérc Lookout, Pogányvár). The condition of the natural assets was rated as good or very good by the majority of visitors who completed the questionnaire (B: 75%, Cs: 67%) in both study areas, and there was no significant difference between the two study areas based on the Chi² test ($p < 0.05$). This was confirmed by local stakeholder groups in Börzsöny, while in Cserhát the natural assets were rated as good and variable condition.

4. **I identified and compared the development potential of the sample sites based on the needs of local stakeholder groups and visitors who filled in the questionnaire, which I divided into three categories:**

a. **Ideas for tourism development based on natural values and assets to showcase natural and landscape values:** I found that there was a significant demand for different guided tours (herbal knowledge, plant knowledge, geology, animal knowledge, landscape history) from visitors who completed the questionnaire in both study areas (B: 30-35%, Cs: 25-35%) and there was no significant difference between the two study areas based on the Chi² test ($p < 0.05$). Guided tours were also mentioned more often by local stakeholder groups and the development of walking/hiking trails/trails was also suggested. During the interviews with local stakeholder groups, I also found that the development of cycling tourism was considered important in both study areas, with the development of horse riding and water tourism being encouraged in Börzsöny and the development of attractions and services in Cserhát.

b. **Development ideas based on local food ingredients and gastro-tourism:** I found that the visitors who filled in the questionnaire suggested the development of shops selling local products (B:30% Cs:35%) and the Chi² test showed that there was no significant difference between the two study areas ($p < 0.05$). Based on the responses of the local stakeholder groups, the establishment of processing and drying plants for berries and small-scale cooperatives for small-scale production and marketing of berries in Börzsöny is considered important, which could be the basis for the development of local tót (Slovak minority group) and sváb (German minority group) gastronomy tourism. Local stakeholders in the Cserhát see a potential for development in the natural and produced goods by setting up a processing plant and cold store to produce local products of higher value.

c. **Other infrastructure development ideas affecting natural assets or tourism directed towards them:** I found that there would be a high demand for benches (B:36%; Cs:36%), toilets (B:39%; Cs:34%) in both study areas from the point of view of visitors who completed the questionnaire and there was no significant difference between the two study areas based on the Chi² test ($p < 0.05$). In the Chert, the development of infrastructure (B:26%; Cs:40%), the development of hospitality facilities (B:18%; Cs:32%) and the visitor centre (B:10%; Cs:32%) were also considered important and there was a significant difference between the two study areas ($p < 0.05$) based on the Chi² test. The local

stakeholder groups, confirming the visitors' responses, also considered the development of a visitor centre in the Cserhát important, and also called for the development of accommodation and catering facilities. In Börzsöny, in connection with the network of cycle paths, the creation of bicycle rental facilities at railway stations and the development of cycle paths to excursion sites were suggested. In both study areas, local stakeholders stressed the importance of maintaining and upkeep of the infrastructure of the excursion sites, and the development and extension of the cycle path network.

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