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Front cover photography: *Jezeršča* and *Laški potok* are just two of the many tributaries of Lake Cerknica, the largest intermittent lake in Slovenia. The water and riparian ecosystems of the lake with its tributaries represent an invaluable habitat for many plants and animals (photograph: Rok Ciglič).
Fotografija na naslovnici: Jezeršča in Laški potok sta le dva izmed številnih pritokov Cerkniškega jezera, največjega presihajočega jezera v Sloveniji. Vodni in obvodni ekosistemi jezera s svojimi pritoki predstavljajo neprecenljivo življenjsko okolje mnogim rastlinam in živalim (fotografija: Rok Ciglič).

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MATEJ OGRIN

Snow cover may last for months in the Planica Valley.

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Danijela Strle[1], Matej Ogrin[2]

Latent cooling of atmosphere as an indicator of lowered snow line: Case study from Planica and Vrata valleys

ABSTRACT: A lowered snow line in Alpine valleys as a local weather phenomenon often varies from one valley to another. The relief morphology of the valleys and the intensity of precipitation play a crucial role in the variation. In Slovenia certain valleys are more susceptible to this phenomenon than others, one such example being the Planica Valley. This paper examines the occurrence of a lowered snow line in the Planica Valley and the Vrata Valley during the winter seasons of 2015/2016 and 2016/2017. Precipitation events accompanying the occurrence of a lowered snow line were analyzed, and data on temperature and precipitation were included in the analysis. Results showed a striking degree of congruence of the phenomenon in both valleys.

KEY WORDS: lowered snow line, mountain climate, local climate, snow precipitation, Vrata Valley, Planica Valley, Slovenia, geography

Latentno ohlajanje ozračja kot pokazatelj znižane meje sneženja: študija primera iz dolin Planica in Vrata

POVZETEK: Znižana meja sneženja se, kot lokalni vremenski pojav, v alpskih dolinah ne pojavlja povsod v enaki meri. Ključno vlogo imata zaprtost dolinskega reliefa ter intenziteta padavin. Splošno znano v Sloveniji je, da so nekatere doline, kot na primer dolina Planice za ta pojav zelo dovzetne, druge pa manj. V nekaterih dolinah je pojav manj poznan zgolj zaradi tega, ker so neposeljene in pozimi tudi neobljudene. Prispevek govori o analizi pojava znižane meje sneženja v dolini Planice in dolini Vrata v dveh zimskih sezonah 2015/2016 in 2016/2017. Analizirani so bili padavinski dogodki s pojavom znižane meje sneženja, v analizo pa smo vključili temperaturne podatke ter podatke o padavinah. Rezultati so pokazali presenetljivo ujemanje pojava v obeh dolinah.

KLJUČNE BESEDE: znižana meja sneženja, gorsko podnebje, lokalno podnebje, sneg, dolina Vrata, dolina Planica, Slovenija, geografija

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1 Introduction

A lowered snow line is a local climatic occurrence that is especially common in Alpine valleys due to mountainous topography, but can also occur outside of the Alpine valleys and on the lowlands (Jaffe 1967; Steinacker 1983; Strle and Ogrin 2016).

The main reason for cooling of the atmosphere is the melting of snowflakes in the layer with a positive temperature, where latent cooling has an important role (Haby 2015). Minder, Durran and Roe (2011) and Minder (2010) studied the impact of latent cooling on the height of the zero isotherm and snow line with model simulations on the windward side of the mountain. In simulations without calculating the latent cooling, the zero isotherm and snow line were higher. As it approaches the mountain slope, the snow line descends evenly while the zero isotherm descends only near the slope. Cooling of atmosphere due to snow melting can even induce a change in the valley flow (Thériault et al. 2015).

In general, this phenomenon is better known in mountain areas than over low and flat areas: an important scientific record a lowered snow line also comes from an Alpine region. In Innsbruck (elevation 580 m) on 6 June 1956 15 cm of snow fell when the zero isotherm was at an elevation between 1200–1500 m, a day after 27 °C was recorded (Jaffe 1967). A lowered snow line can also appear in open areas, but in such cases winds must be very weak and precipitation strong. In Slovenia such a case was recorded on 18 April 2015 in Logatec (elevation 477 m), when intense and long-lasting precipitation caused an unexpected lowering of the snow line in the Notranjska region of Slovenia when the zero isotherm was at an elevation of around 1000 m (Likar 2015; Slovenian … 2020). Weakening of advection due to mountain relief is not the only reason for a frequent lowered snow line in Alpine valleys. Marwitz (1983; 1987) found that during heavy precipitation the snow line descends considerably lower than in nearby areas with the same air mass. The longer the precipitation lasts, the lower the zero isotherm and the snow line. With increasing precipitation intensity, the lowering of the isotherm and snow line occurs more rapidly (Minder, Durran and Roe 2011). Steinacker (1983) notes that in Alpine valleys the amount of precipitation for cooling the atmosphere is smaller than in open areas due to the »volume effect«. Unterstrasser and Zängl (2006) agree that since the horizontal cross-section of the valley decreases towards the valley bottom, the volume of the air mass below the snow line decreases more rapidly than it does outside valleys. For lowering the zero isotherm to the valley bottom, the initial elevation of the zero isotherm is important. In Alpine valleys the zero isotherm starts to descend much faster if the initial elevation is under the elevation of mountain ridges, which prevents warm air from the surrounding area from entering the area of precipitation and cooling. In extreme cases the thickness of the isotherm layer can reach 3 km (Stewart 1992); however, usually it reaches up to 1 km (Kain, Goss and Baldwin 2000). A typical feature of the lowered snow line phenomenon is significant fluctuation in the snow line within the same air mass and between areas in close proximity. In such cases, often the snow line occurs much lower than predicted (Pehsl 2010). Strle (2018) identified three different types of weather conditions for lowered snow line. These are warm advection, cold advection and cold air lake.

Very little is known about the local climate of Alpine valleys which are uninhabited, such as the Vrata Valley. Although it is well visited in summer, in winter it is virtually devoid of people apart from infrequent mountaineers and climbers. Because it is long (12 km) and impassable in winter, it is one of the less frequently visited Slovenian Alpine valleys in this time of the year. The Planica Valley is also one of the longest in the Slovenian Julian Alps (8 km), but we know more about the local climate there, especially regarding precipitation (Ogrin and Kozamernik 2019; 2020). Precipitation condition in Julian Alps are typical for mountain areas relatively close to the sea with significant precipitation gradients and high precipitation amounts which were discussed already in previous studies (e.g. Ogrin and Ortar 2007; Hrvatin and Zorn 2017)

In Slovenia, a lowered snow line in certain valleys in the Julian Alps was investigated by Strle (2015; 2018) and Strle and Ogrin (2016). Based on a three-year study of the phenomenon, we have obtained a large amount of data, presented in this paper. Research in recent years has provided insight into the magnitude and characteristics of a lowered snow line in some Alpine valleys in the Slovenian part of the Julian Alps.

The aim of this paper is to determine the occurrence of a lowered snow line in the Vrata and the Planica valleys through an analysis of temperature conditions during precipitation events. Our aim was also to analyse similarities and differences in a lowered snow line of the two valleys, which are located near to

one another. Since this is also the reason for similar amount and pattern of precipitation the main questions were if lowered snow line occurs at the same time and if the cooling in both valleys is of the same rate. Such detailed questions were not discussed in papers, published so far.

2 Methods

A characteristic feature of a lowered snow line is that during the precipitation event in the valley it first rains, then an increasingly thick vertical layer of air is gradually formed with a temperature of 0 °C or a few tenths of a degree above 0 °C (Stewart 1992; Kain, Goss and Baldwin 2000; Lackmann et al. 2002; Strle and Ogrin 2016). We therefore analysed temperature conditions during winter precipitation events at different locations and elevations in both valleys. In the temperature analysis from our temperature recording stations we included data obtained in the winters of 2015/2016 and 2016/2017, each from the beginning of December to the end of April. In the Planica Valley, the lowest placed station was Planica 1 at an elevation of 990 m, followed by the Planica 2 station at an elevation of 1200 m, while the highest station was Planica 3 at an elevation of 1390 m (Figure 1). Four stations were set up in the Vrata Valley. The lowest-lying station, Vrata 1, was placed at an elevation of 725 m, followed by the Vrata 2 station at an elevation of 770 m, the Vrata 3 station at an elevation of 940 m, and the highest placed station, Vrata 4, at an elevation of 1115 m (Figure 1).

For an even better understanding of the dynamics of the vertical temperature gradient, we obtained temperature data from the Society for Weather and Climate Research (Archive of the Society … 2017) from the station located on the high mountain plateau of Kriški Podi at an elevation of 2050 m (Figure 1). As precipitation is crucial for the occurrence of a lowered snow line, we also obtained data on precipitation duration and intensity from the ARSO weather stations closest to our measuring spots, collecting data from

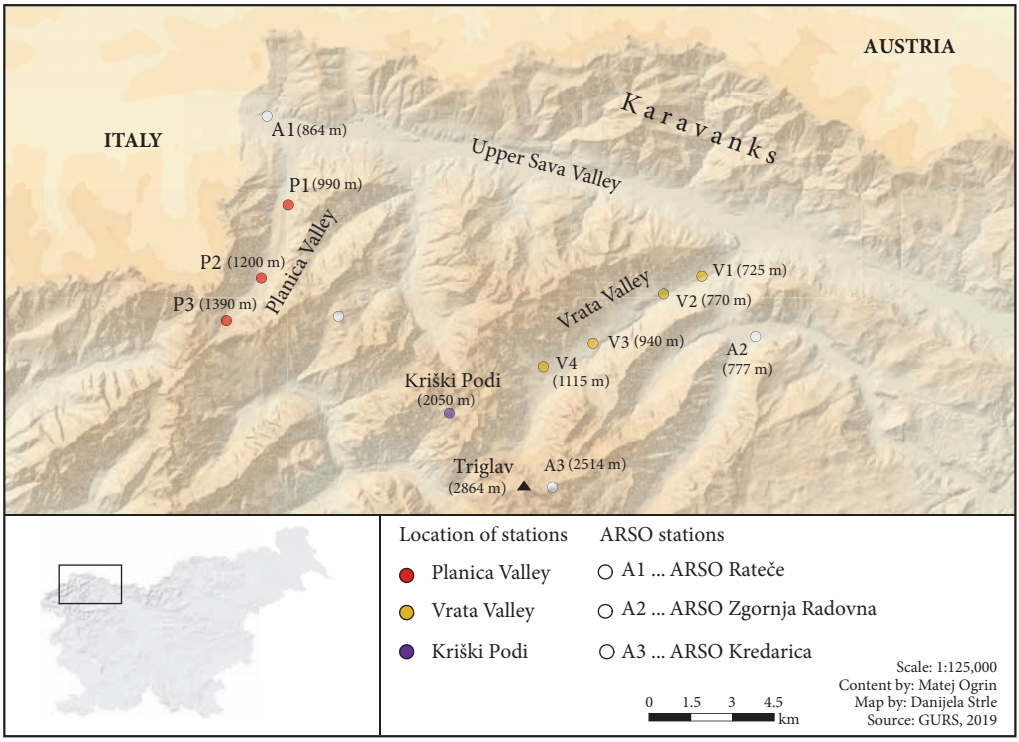

Figure 1: Research area with locations of the measuring stations (see Table 1 for details).

the Rateče and Zgornja Radovna stations. The distance from the Rateče weather station to the nearest station in Planica (P1) was 3.3 km, and it was 7.5 km to the farthest station (P3), while the distance from the Zgornja Radovna weather station to our stations in the Vrata Valley was 2.9 km (V1) and 7.7 km (V4). We did not take data from the ARSO Kredarica high mountain station (2515 m), since the accuracy of precipitation data in winter may be questionable due to the influence of wind (Yang et al. 1994; Førland et al. 1996; Pristov, Pristov and Zupančič 1998; Nešpor and Sevruk 1999; Dolinar, Ovsenik Jeglič and Bertalanič 2006). Precipitation data recorded at ARSO stations only served as a rough estimate of the intensity and duration of precipitation in each valley; we did not compare precipitation intensities in the two valleys.

The temperature was measured using an *iButton* digital thermometer, which was placed in a radiation shield representing an imitation of a Stevenson screen (Vertačnik and Sinjur 2013). The radiation shield protected the digital thermometer from the effects of weather that might influence the accuracy of the data recorded. Digital thermometers in the Planica Valley were set at a resolution of 0.1 °C and the temperature was recorded every 15 minutes. In the Vrata Valley, digital thermometers were set at a resolution of 0.5 °C and the temperature likewise recorded at 15-minute intervals. The reason for the different resolutions is that the Vrata Valley is remote and hard to reach in winter, when there is also a danger of snow avalanches. The measurement period was 85 days for a resolution of 0.5 °C so that we did not need to collect the data as frequently as in the Planica Valley. All measurements were recorded using winter UTC+1 time. Where recorders were set at a resolution of 0.1 °C, one series of measurements lasted 42 days. The radiation shelter on the Kriški Podi Plateau contained a *Madgetech TransiTempII* temperature data logger and was set to a resolution of 0.1 °C, recording data every 15 minutes. It likewise measured temperature using winter UTC+1 time.

Since we were interested only in temperature conditions during times of precipitation, when there is no direct sunlight, the influence of the microlocation on temperature data was negligible, and so we simply attached the temperature recording equipment to the trunks of trees. After completing a series of measurements, we transferred the data from the recorders to a laptop and reset the recorders. Data loss due to *iButton* failure were very few. Only in case of 5 February 2017 we recorded loss of data on station V3, however this did not affect the quality of research.

Table 1: Metadata of measuring stations.

Area	Station	Elevation (m)	Geographical coordinate		Measuring instrument	Measured parameter and measurement interval (min)
			Y (west – east)	X (south – north)		
Planica Valley	Planica 1 (P1)	990	402329	147956	Digital recorder	Temperature; 15
	Planica 2 (P2)	1,200	401370	145330	Digital recorder	Temperature; 15
	Planica 3 (P3)	1,390	400113	143802	Digital recorder	Temperature; 15
	ARSO* Rateče (A1)	864	401574	151142	ARSO	Temperature; 30 Rainfall rate; 30
Vrata Valley	Vrata 1 (V1)	725	417179	145396	Digital recorder	Temperature; 15
	Vrata 2 (V2)	770	415803	144761	Digital recorder	Temperature; 15
	Vrata 3 (V3)	940	413263	142988	Digital recorder	Temperature; 15
	Vrata 4 (V4)	1115	411490	142142	Digital recorder	Temperature; 15
Kredarica	ARSO* Kredarica (A3)	2,514	411822	137823	ARSO	Temperature; 30 Rainfall rate; 30
Radovna Valley	ARSO* Zgornja Radovna	777	419111	143227	ARSO	Temperature; 30 Rainfall rate; 30
Kriški Podi Plateau	Kriški Podi (A2)	2,050	408116	140475	Digital recorder	Temperature; 30 Rainfall rate; 30

*Archive of Slovenian Environment Agency 2020.

When a lowered snow line occurs, a zone of zero isotherm is established in the valley (Figure 2), so in the analysis of temperatures during precipitation we focused primarily on this phenomenon. We then compared the dynamics of cooling between the two valleys and in this way identified differences and similarities in the occurrence of a lowered snow line.

3 Results

We provide temperature analyses for seven snow events of a lowered snow line in the winter seasons 2015/2016 and 2016/2017 in both valleys and on Kriški Podi (2050 m). Temperature conditions at stations in each valley at roughly the same elevations were analysed. In two cases we refer to temperatures only from higher-lying parts of the valleys and in five cases temperatures from both higher and lower parts. The higher

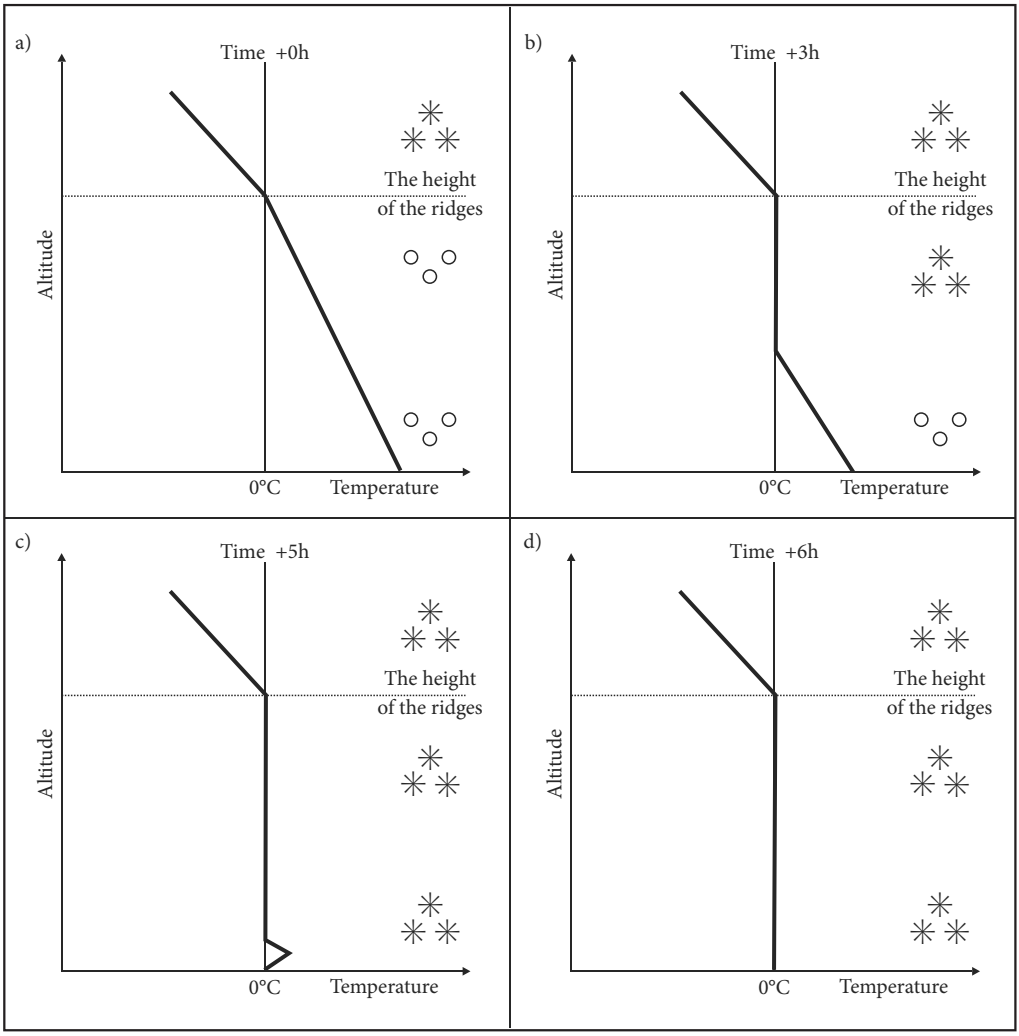

Figure 2: The transition from heavy rain to snow at the surface due to the absorption of latent heat from melting snowflakes (modified after Lackmann et al. 2002, 1018).

stations were Planica 2 (P2, 1200 m) in the Planica Valley and Vrata 4 (V4, 1115 m) in the Vrata Valley, while the lower ones were Planica 1 (P1, 990 m) in the Planica Valley and Vrata 3 (V3, 940 m) in the Vrata Valley.

3.1 Snow event 1: 7–8 February 2016

In the snow event recorded on 7 and 8 February 2016, the temperature congruence in the Vrata and Planica valleys at both elevations was very pronounced, indicating the simultaneous occurrence of a lowered snow line. At higher stations, the cooling in the Vrata Valley was slightly less pronounced or rather took place more slowly than in Planica, and even when the temperature reached its lowest values, the temperature remained a few tenths higher than in the Planica Valley. Pronounced warming at the end of precipitation at higher stations occurred at the same time (Figure 3). At lower-lying stations, the cooling and warming curves were even more closely aligned. Although the cooling started about 90 minutes later in the Vrata Valley, the temperature curves soon merged (Figure 4). The occurrence of a lowered snow line in both valleys took place in a very similar way and almost simultaneously.

3.2 Snow event 2: 9–10 February 2016

The data for the second snow event, which took place on 9 and 10 February 2016, show a strongly congruent cooling and occurrence of a lowered snow line in the two valleys. With the intensification of precipitation, which occurred in the Vrata Valley a little earlier than in the Planica Valley, the atmosphere began to cool, about 45 minutes earlier in Vrata than in Planica. From the temperature on Kriški Podi (2050 m) we see that cold advection started after the lowered snow line effect in both valleys cooled the atmosphere to 0 °C. Due to cold advection, the temperature at both higher stations dropped below 0 °C (to around –2 °C) (Figure 5), while at lower stations it dropped below 0 °C for only a short time, and not lower than –1.5 °C (Figure 6).

3.3 Snow event 3: 28 February–1 March 2016

The case on 28 February –1 March 2016 involved precipitation at intervals and initial warming in both valleys. In the Vrata Valley, at station V4 this was followed by fluctuations in temperature that coincided with the beginning and end of precipitation. When precipitation stopped, the temperature rose to 2 °C or even 3 °C, but when precipitation occurred it cooled to an interval between 0 °C and 0.5 °C. There was hardly any temperature fluctuation in Planica (P2) during precipitation (Figure 7). No fluctuations were recorded at the lower stations in either valley. One exception is the incidence between 11 am and 3 pm on 10 February when the temperature rose by about a degree when the precipitation stopped or lessened. The temperature dynamics at lower-lying stations were quite similar during precipitation (Figure 8).

3.4 Snow event 4: 5 March 2016

In the snow event examined on 5 of March 2016, the temperature trajectories in the Vrata Valley and the Planica Valley largely coincided at both higher and lower-lying stations. At higher stations, we observed brief periods of temperature divergence, when the temperature in Planica rose from 0 °C to about 2 °C with a short-term lessening of precipitation. Something similar occurred at the end of precipitation when the temperature in the Vrata Valley increased by 0.5 °C (Figure 9). There was a difference even before the onset of precipitation when a weak inversion was present in the Planica Valley, which only dissipated through the cooling of the higher layer of air due to melting and warming of the lower layer. A slightly more pronounced inversion layer formed in the Vrata Valley, which also dissipated quickly after precipitation began, and the upper station had the same temperature or was slightly (0.5 °C) cooler (Figure 9; Figure 10).

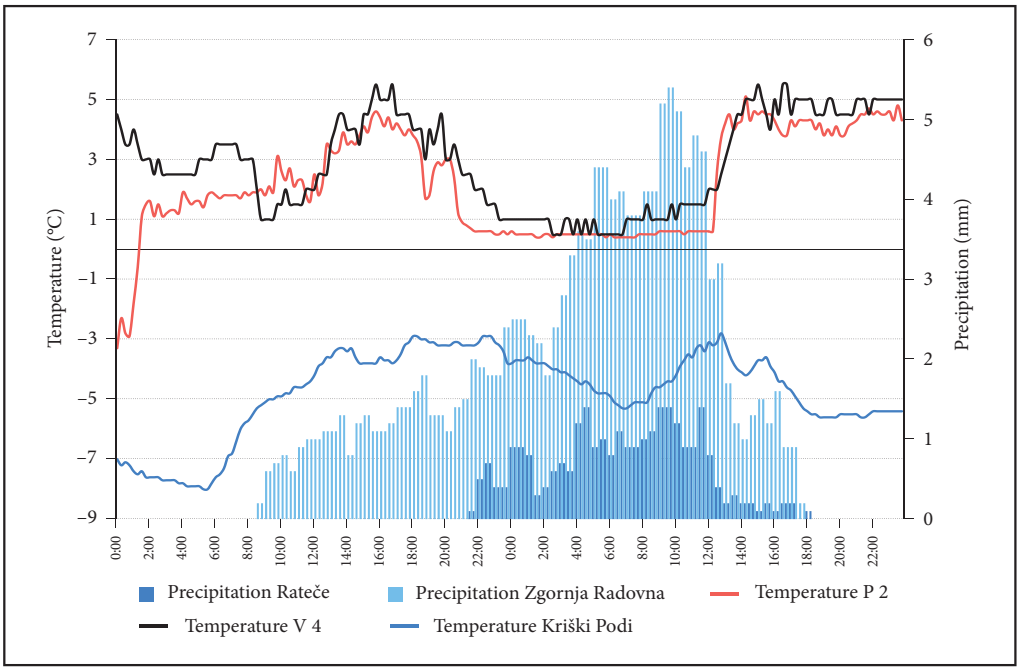

Figure 3: Dynamics of temperature and precipitation on the Kriški Podi Plateau (2050 m) and at higher-lying stations in the Vrata Valley (V4, 1115 m) and the Planica Valley (P2, 1200 m) during an occurrence of a lowered snow line in the night from 7 to 8 February 2016.

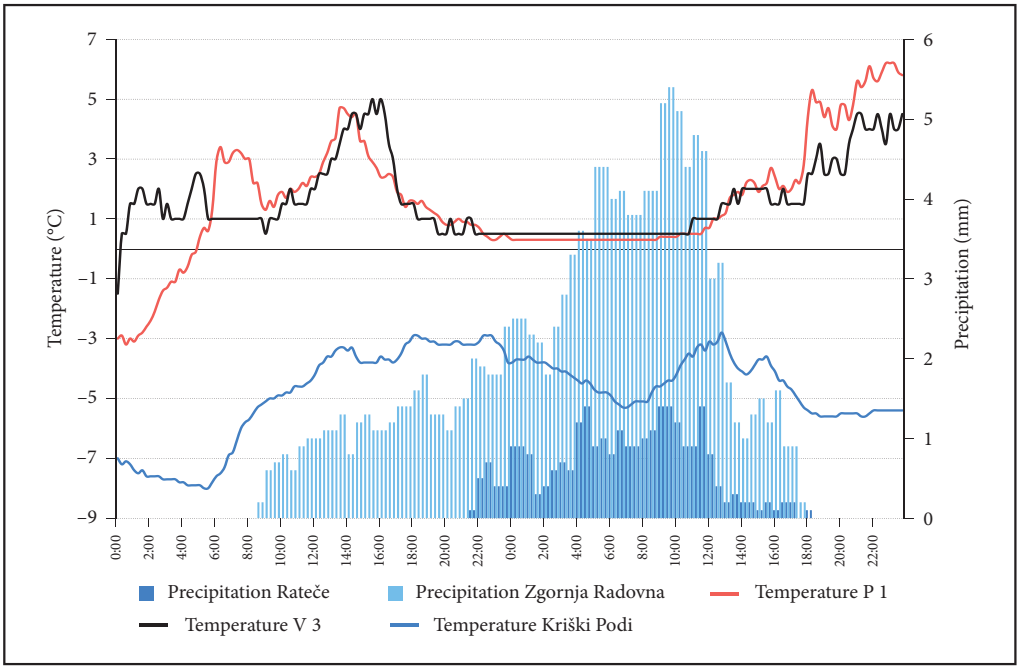

Figure 4: Dynamics of temperature and precipitation on the Kriški Podi Plateau (2050 m) and at lower-lying stations in the Vrata Valley (V3, 940 m) and the Planica Valley (P1, 990 m) during an occurrence of a lowered snow line in the night from 7 to 8 February 2016.

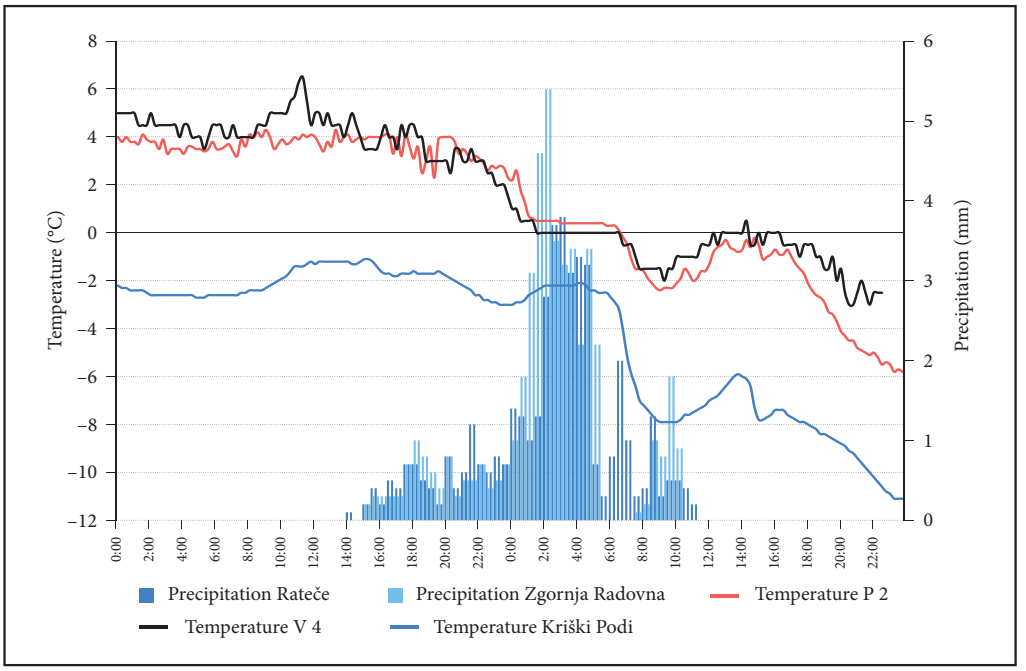

Figure 5: Dynamics of temperature and precipitation on the Kriški Podi Plateau (2050 m) and higher-lying stations in the Vrata Valley (V4, 1115 m) and the Planica Valley (P2, 1200 m) during an occurrence of a lowered snow line in the night from 9 to 10 February 2016.

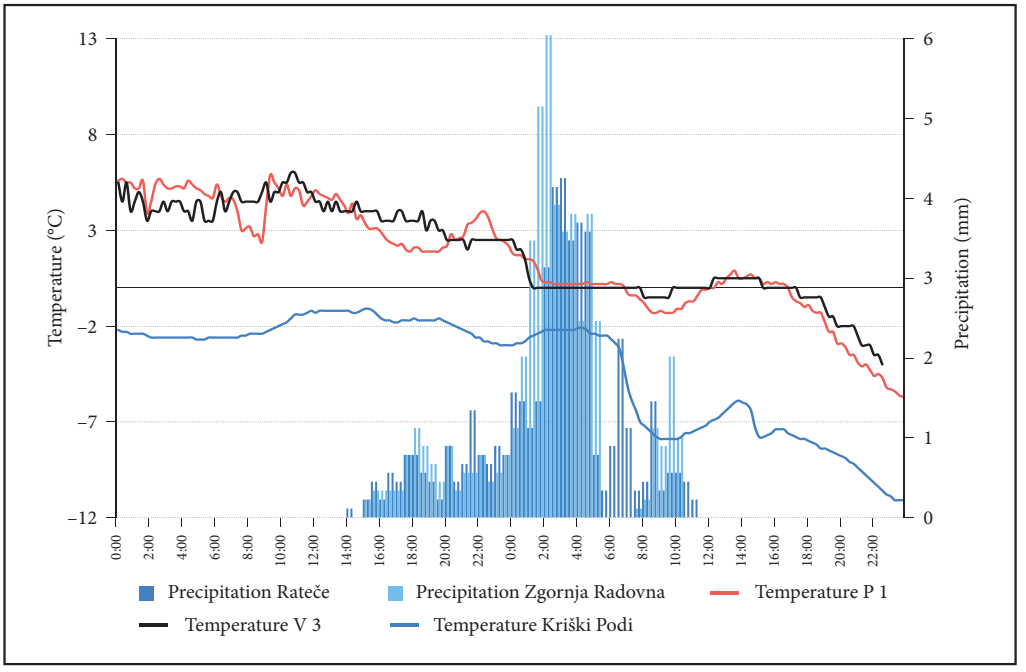

Figure 6: Temperature and precipitation dynamics on the Kriški Podi Plateau (2050 m) and at lower-lying stations in the Vrata Valley (V3, 940 m) and the Planica Valley (P1, 990 m) during an occurrence of a lowered snow line in the night from 9 to 10 February 2016.

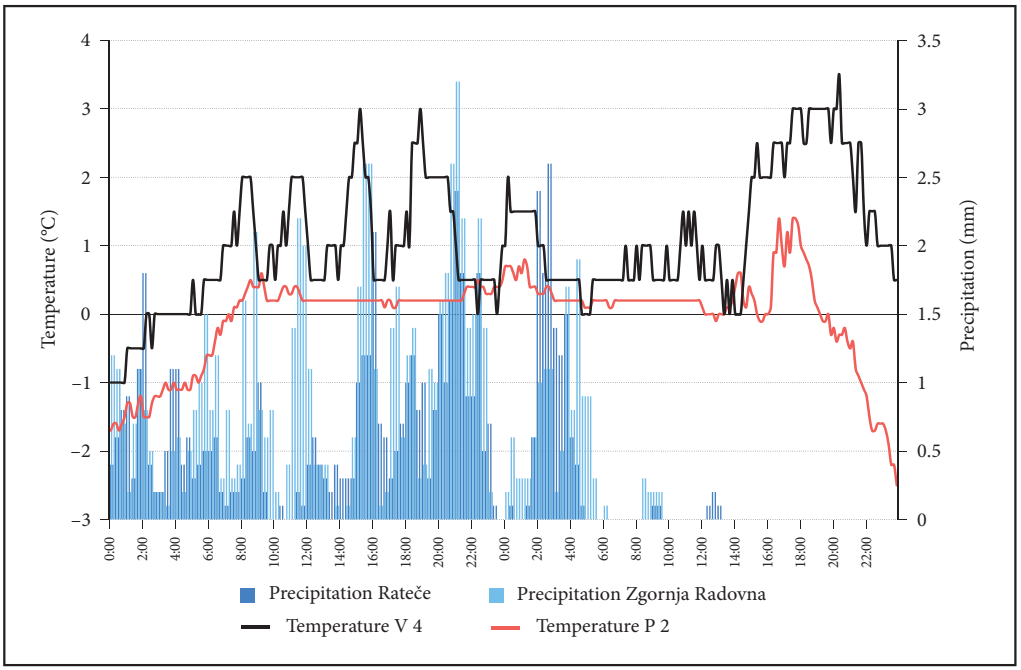

Figure 7: Dynamics of temperature and precipitation at higher-lying stations in the Vrata Valley (V4, 1115 m) and the Planica Valley (P2, 1200 m) during an occurrence of a lowered snow line in the night from 28 February to 1 March 2016.

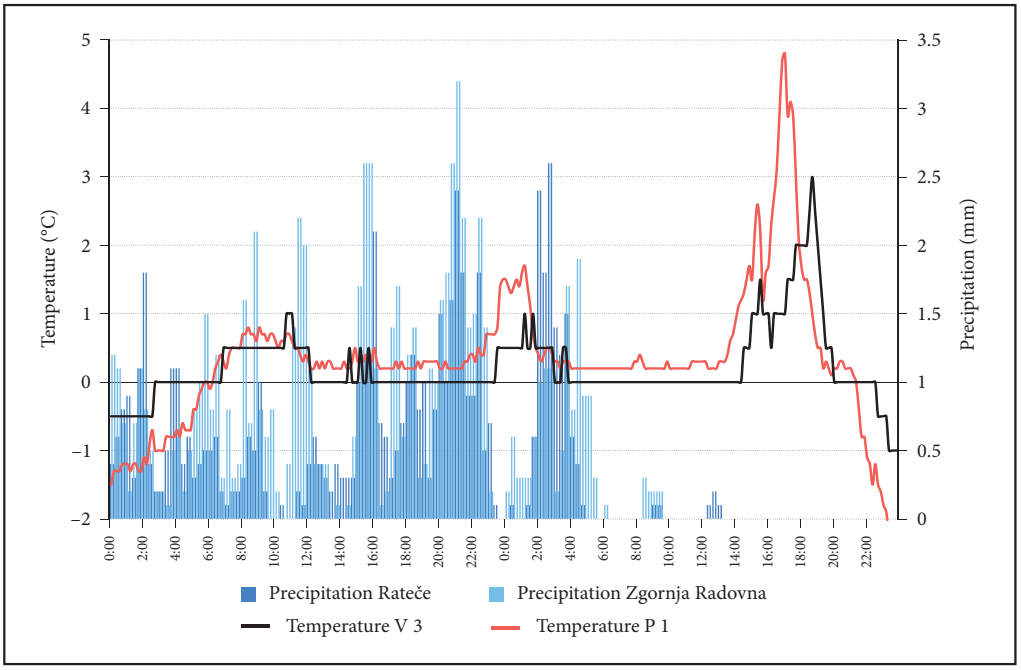

Figure 8: Dynamics of temperature and precipitation at lower-lying stations in the Vrata Valley (V3, 940 m) and the Planica Valley (P1, 990 m) during an occurrence of a lowered snow line in the night from 28 February to 1 March 2016.

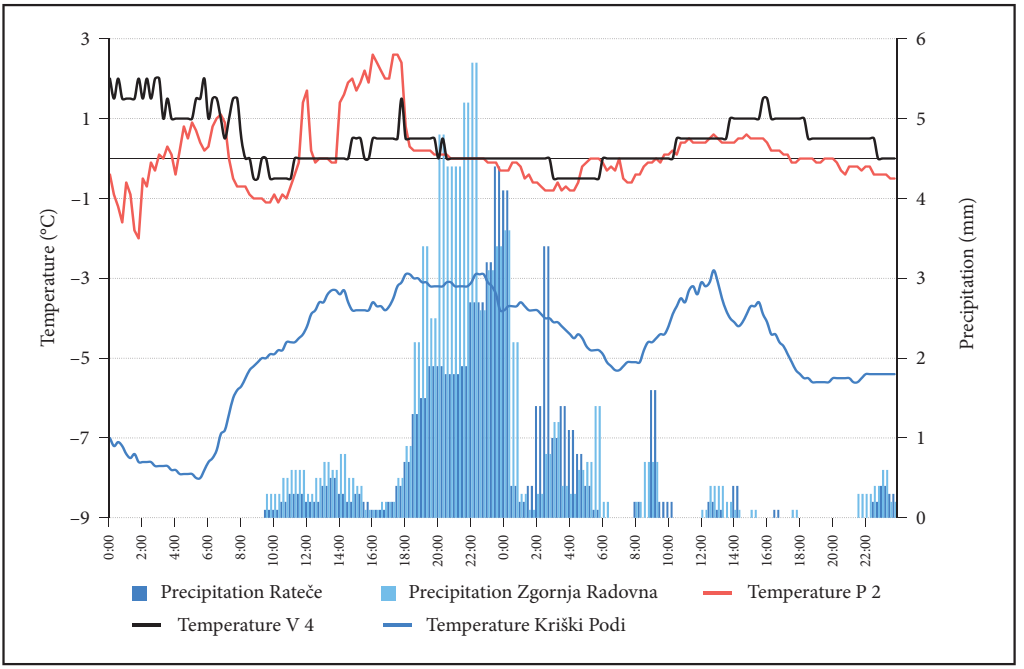

Figure 9: Dynamics of temperature and precipitation on the Kriški Podi Plateau (2050 m) and at higher-lying stations in the Vrata Valley (V4, 1115 m) and the Planica Valley (P2, 1200 m) during an occurrence of a lowered snow line on 5 March 2016.

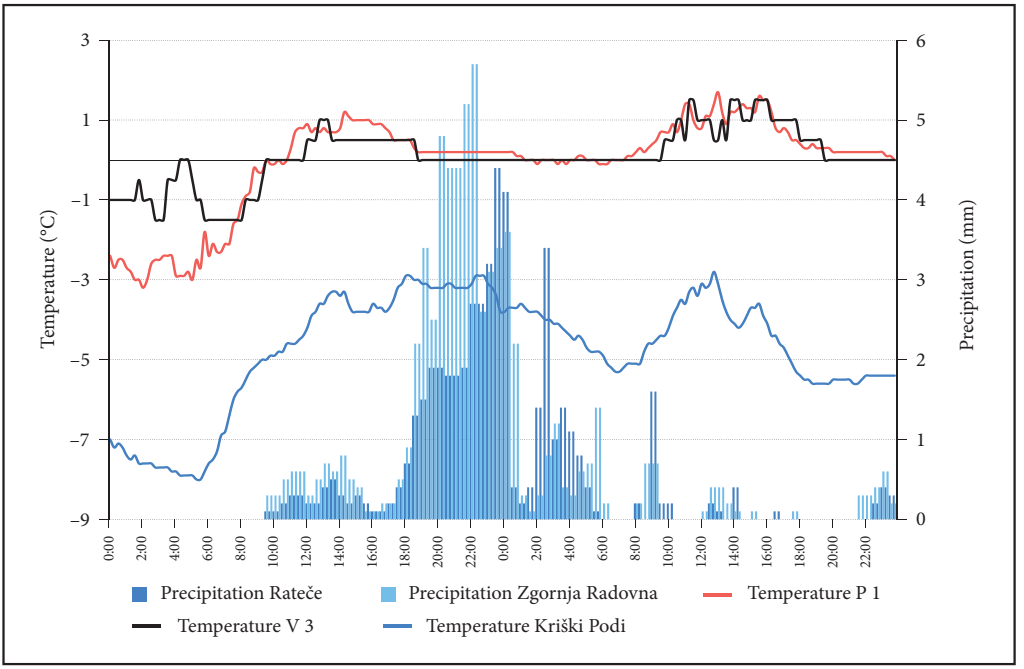

Figure 10: Dynamics of temperature and precipitation on the Kriški Podi Plateau (2050 m) and at lower-lying stations in the Vrata Valley (V3, 940 m) and the Planica Valley (P1, 990 m) during an occurrence of a lowered snow line on 5 March 2016.

3.5 Snow event 5: 5 February 2017

In the snow event on 5 February 2017, for which we have available only data from higher-lying stations, there was noticeable warming in the Planica Valley and the Vrata Valley that coincided with warming on the Kriški Podi Plateau. During the time of precipitation, the temperature in the Planica Valley stayed within an interval between –0.5 °C and +0.5 °C, while in the Vrata Valley the temperature dropped from 2.5 °C to 0.5 °C during precipitation. At the end of precipitation, the temperature in the Vrata Valley rose (to between 2 and 3 °C) while in the Planica Valley it remained at 0 °C. In this case, we do not see a complete congruence since the inversion in the Planica Valley was more pronounced and there was no dissipation. Even so, both temperature curves become closest at the onset of precipitation, as confirmed by the coincidence of a lowered snow line in both valleys (Figure 11).

3.6 Snow event 6: 28 February–1 March 2017

In the sixth snow event, we only have data available for higher-lying stations. The occurrence was recorded on 28 February 2017, when precipitation and a lowered snow line were followed by cold advection. An almost concurrent cooling is seen in both valleys when precipitation occurred, and then cooling stopped at 0 °C (P2) or at 0.5–1 °C (V4). Temperatures dropped below 0 °C only with cooling due to cold advection, which is also visible in the dynamics of temperature on the Kriški Podi Plateau. The cooling was slightly more pronounced in the Planica Valley, although it occurred about two hours later. A temperature of 0 °C was reached in Planica sooner than in the Vrata Valley due likely to the approximately 85 m higher elevation of the Planica station (Figure 12).

When precipitation ended, the temperatures rose by 2–3 °C (Figure 12). In this case as well the occurrence of a lowered snow line largely coincided in the two valleys, and cooling was more pronounced in the Planica Valley by about one degree, but this difference could be attributed to the 85 m higher elevation of the station (Figure 1).

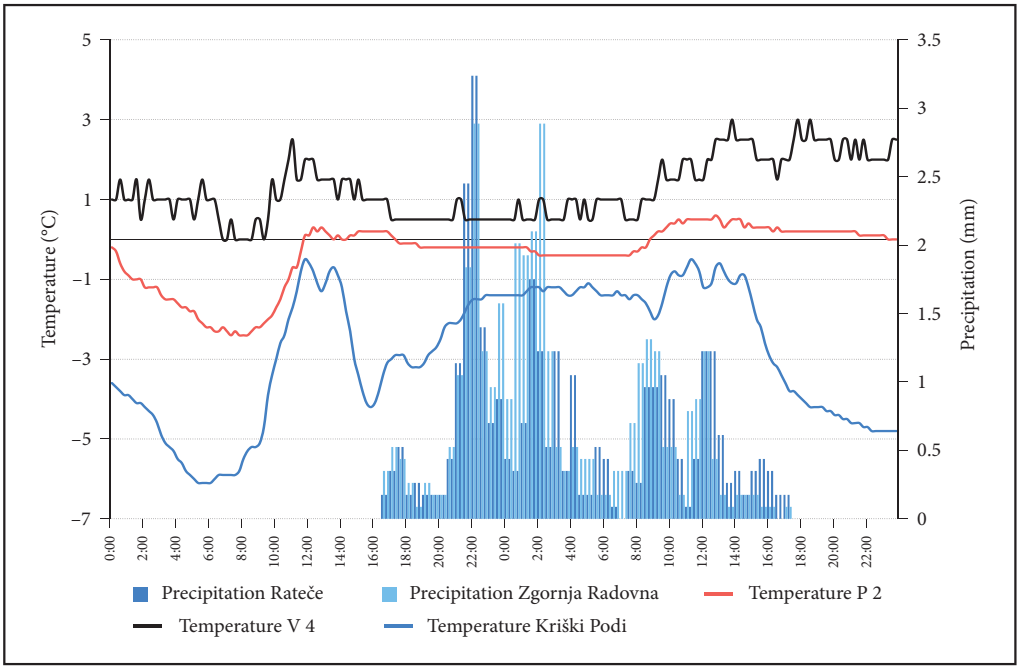

Figure 11: Dynamics of temperature and precipitation on the Kriški Podi Plateau (2050 m) and at higher-lying stations in the Vrata Valley (V4, 1115 m) and the Planica Valley (P2, 1200 m) during an occurrence of a lowered snow line on 5 February 2017.

3.7 Snow event 7: 4–5 March 2017

An analysis of snow event 7, recorded on the evening of 4 March 2017, shows temperature dynamics is similar to previous cases. Cooling was slightly more pronounced in the Planica Valley, but the temperature difference was less than one degree (Figure 13).

4 Discussion

Determination of a lowered snow line through an analysis of temperature profiles during precipitation events has proven to be very useful. An analysis of temperature distribution with elevation within the valley system shows very clearly whether or not the effect of a lowered snow line has occurred. The phenomenon of a lowered snow line in Slovenia is best known in the Upper Sava Valley and partly in Bohinj because these areas are inhabited. There are also weather stations of the Slovenian Environment Agency (ARSO) in Rateče and Bohinj, and both areas are host to visitors in winter. It is difficult to obtain meteorological observation data from remote and inaccessible valleys, since these are uninhabited and do not have permanent automatic weather stations and cameras. In our study, temperature conditions were determined in a relatively simple way in two valleys, which also enables research on the prevalence of the phenomenon and its dependence on other factors, for example, valley morphology and orientation. In our study, it also turned out that the phenomenon in valleys that are sufficiently close to one another and similarly closed to the advection of wind is quite similar but not entirely identical. To completely exclude temperature differences due to elevation, it would be even better if the stations were set up at exactly the same elevation. We also noticed, that in the case of no wind and the effect of a lowered snow line, differences in elevation of up to about 50 m do not have a significant effect on temperature, but when advection is present in dry air, the difference in elevation can also mean a temperature difference of up to 0.5 °C, whereas during advection in saturated air these differences are smaller and amount to about 0.3 °C.

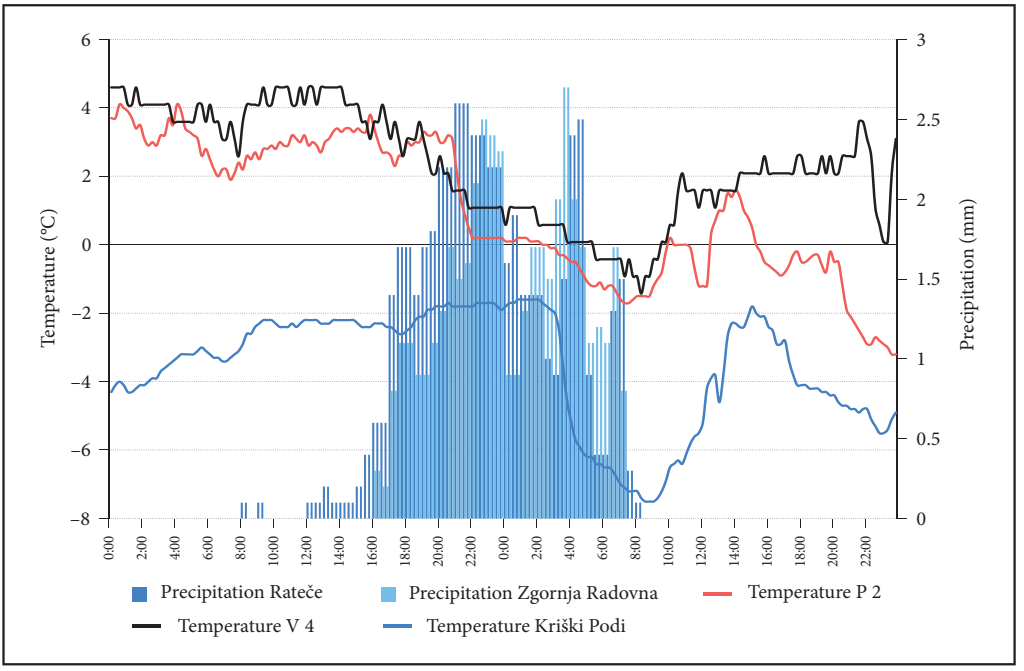

Figure 12: Dynamics of temperature and precipitation on the Kriški Podi Plateau (2050 m) and at higher-lying stations in the Vrata Valley (V4, 1115 m) and the Planica Valley (P2, 1200 m) during an occurrence of a lowered snow line in the night from 28 February to 1 March 2017.

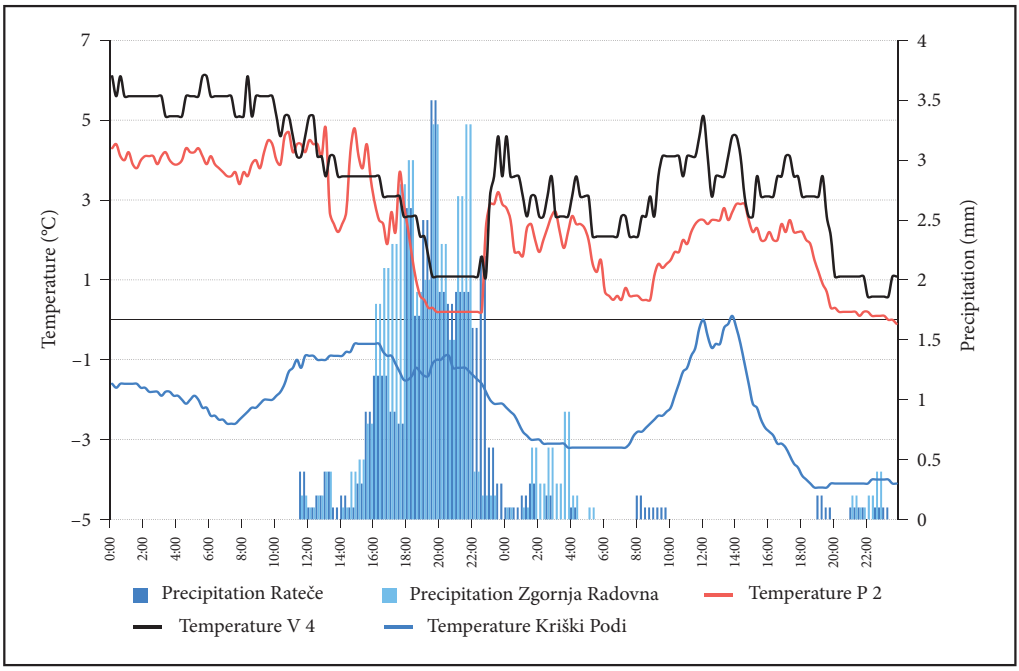

Figure 13: Dynamics of temperature and precipitation on the Kriški Podi Plateau (2050 m) and at higher-lying stations in the Vrata Valley (V4, 1115 m) and the Planica Valley (P2, 1200 m) during an occurrence of a lowered snow line in the night from 4 to 5 March 2017.

The analysis of temperature conditions during a lowered snow line occurrence in the Vrata Valley and the Planica Valley showed considerable coincidence in the two valleys during the period of measurement. Comparison of temperatures at two elevations in the two valleys also showed a slight divergence of temperatures, with slightly more pronounced cooling observed in the Planica Valley in five of the nine instances (taking into account both the higher and lower stations). In calm atmosphere condition this is due to a more pronounced inversion. In the case of cold advection, part of this difference can be explained by the difference in elevation, since the higher station in Planica (P2) was located about 85 m higher and the lower station in Planica (P1) about 50 m higher than the corresponding stations in the Vrata Valley. The difference in the resolution of the measurements should also be taken into account: the thermometers in Planica were set to a resolution of 0.1 °C and in Vrata to 0.5 °C. The lower resolution and consequently longer period of measurements in the Vrata Valley was, as discussed in section 2, due to the remoteness of the valley and safety concerns.

The proximity of the valleys to one another plays an important role, but it is not the only factor contributing to similar intensity of a lowered snow line, nor it is a decisive one. The elevation of the surrounding mountains is also a contributing factor in the occurrence of a lowered snow line due to weakening of advection. Minder, Durran and Roe (2011) with model simulations showed that at higher wind speed, lowering of the snow line weakens. Simulations also showed that weakening of advection could also be the result of the blocking effect of relief, which is often the case in mountainous areas. An effect similar to weakening of advection due to blocking by mountains also occurs in deep and closed Alpine valleys. The ridges above the valleys protect them against strong winds, which also explains why a lowered snow line appears more often and more intensively in Alpine valleys (Unterstrasser and Zängl 2006). The importance of weak advection was also confirmed by Kain, Goss and Baldwin (2000). As in the Planica Valley, the Vrata Valley is also surrounded by high ridges over 2000 m in elevation at the valley head. In particular, the northern side surrounding the valley rises above 1900 m at the entrance to the valley with the slopes of Vrtaško Sleme (2076 m) and Vrtaški Vrh (1898 m) and then rapidly exceeds 2000 m. At the southern edge of the valley, the slopes rise more gradually, reaching 2000 m only with the slopes of the summit Nad Kuhinjo Špica

(2266 m). The ridges are high enough to protect both valleys often from strong advection. On the other hand, the elevation of the ridges is also important for the air temperature at the upper boundary of the valley, where precipitation enters the valley system and where advection begins to weaken. The head of the Vrata Valley, which is surrounded by the highest mountains in Slovenia (for example, the north wall of Triglav with the Triglav massif (2864 m) and Škrlatica (2740 m) especially weakens advection in the valley from north, south and west, and the narrow passage by way of Luknja Saddle (1758 m) does not have a significant effect in these cases. The Vrata and Planica valleys are quite similar with respect to the closed-in nature of the valley heads and so a lowered snow line occurrence is primarily influenced by this feature of the valley heads of both valleys. In both valleys precipitation increases towards the head of the valley significantly and this is also an important factor for lowered snow line.

Kain, Goss and Baldwin (2000) cited steady or moderate intensity of precipitation for at least several hours as an important factor for lowered snow line and this is the case in our study. In the same study Kain, Goss and Baldwin (2000) cited surface temperatures close to freezing point at the beginning of precipitation also as an important factor. Measurements in our study indicate, that occurrence of lowered snow line in Vrata and Planica valleys is rarely connected with cold air pool at the bottom of the valley. However, if cold air pool is formed prior the precipitation and it does not dissipate when precipitation starts, snow line lowers even faster.

In a study of latent cooling effect in the south Alpine Toce valley Zängl (2007) argues that cooling by evaporating cloud water also influences temperature, especially if valley atmosphere continues to be subsaturated due to down valley wind. If snow melts already above the valley, the contribution of evaporating cloud water to cooling can be of major importance. In our case we know, that falling snowflakes melted in the valley system, but we did not have wind data to observe any downwinds.

The location north of the main Julian Alps massif also plays an important role, contributing to the attenuation of southern winds in the lower layers of the atmosphere. An analysis of snow conditions in both valleys would certainly contribute to a better understanding of the intensity of the occurrence, but we do not have this data.

5 Conclusion

Through an analysis of temperature conditions during precipitation events we identified cases of a lowered snow line in the Vrata and Planica valleys. Since many Alpine valleys are remote and without systematic meteorological monitoring, this method proved to be useful and representative. We can conclude that in both valleys lowered snow line occurs practically at the same time which is a result of similar influence of topography. In both valleys south and west advection are often disturbed or weakened due to mountain topography while the precipitation gradients increase precipitation in heads of the valley significantly (in Planica for factor 1,8) (Ogrin and Kozamernik, 2019) The strong temporal coincidence of the latent cooling of the valley atmosphere during precipitation, as well as very similar temperature conditions, suggest similar snow conditions; however, snow conditions were not discussed since snow data were not available.

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RECENT MARRIAGE AND CHILDBEARING TRENDS IN CROATIA AND SLOVENIA: A COMPARATIVE REVIEW

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VERA GRAOVAC MATASSI

The average number of children per woman in childbearing age in both, Croatia and Slovenia is less than two.

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Recent marriage and childbearing trends in Croatia and Slovenia: A comparative review

ABSTRACT: The paper discusses the marriage and childbearing trends in Croatia and Slovenia from 1985 to 2017. We made a comparative review of several indicators related to marriage and childbearing trends: mean ages of women at first marriage and first childbirth, birth rates, births within and outside marriage, total fertility rate, tempo-adjusted fertility rate, age-specific fertility rates, and marriage rate. The analysis is based on the official statistical data provided by the statistical offices of both countries and Human Fertility Database. Many of the indicators, including the birth rate, total fertility rate and age-specific fertility rate, are somewhat more favourable in Slovenia than in Croatia. One of the major differences between the two countries is that in Slovenia the connection between marriage and childbearing is not as nearly significant as in Croatia.

KEY WORDS: population geography, marriage, childbearing, fertility, birth rates, Croatia, Slovenia

Najnovejši trendi sklepanja zakonskih zvez in rojevanja na Hrvaškem in v Slovniji: primerjalna študija

POVZETEK: V članku avtorici proučujeta trende sklepanja zakonskih zvez in rojevanja na Hrvaškem in v Sloveniji med letoma 1985 in 2017. Primerjata različne s tem povezane kazalnike: povprečno starost ob sklenitvi prve zakonske zveze in rojstvu prvega otroka, nataliteto, število rojstev znotraj in zunaj zakonske zveze, celotno stopnjo rodnosti in stopnjo poročnosti. Analiza temelji na uradnih podatkih statističnih uradov obeh držav in na podatkovni bazi Human Fertility Database. Vrednosti več kazalnikov, vključno z nataliteto, celotno stopnjo rodnosti in starostjo ob rojstvu prvega otroka, so za Slovenijo nekoliko ugodnejše kot za Hrvaško. Ena večjih razlik med državama je ta, da v Sloveniji povezava med zakonsko zvezo in rojevanjem še zdaleč ni tako pomembna kot na Hrvaškem.

KLJUČNE BESEDE: geografija prebivalstva, zakonska zveza, rojevanje, rodnost, nataliteta, Hrvaška, Slovenija

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1 Introduction

The collapse of the state socialist system in Central and Eastern Europe (CEE) in late 1980s and early 1990s resulted in unprecedented social and economic changes (new political and social freedoms, transition to market economy, income inequalities and unemployment, expansion of university education, social stratification, etc.). Those changes affected, among other things, the marriage and childbearing trends. Although there are numerous similarities regarding economic, social and family trends in CEE after the collapse of the socialist system, there are also some important differences. Even before 1990s, birth control and fertility decline of the first demographic transition generally started sooner in western, more industrialized and in economically more developed parts of the CEE (Nejašmić 2002; Sobotka 2011).

Demographic data indicate that already in 1960s, the birth rates in many former socialist countries were around or below 14 per 1,000 and the total fertility rate (TFR) fell below 2.1. The underlying causes of those changes were intensive industrialization, migration from rural to urban areas, increased employment in non-agricultural sectors (particularly the employment of women), aspirations to a better material standard of living and double income, etc. (Wertheimer-Baletić 1999). Nejašmić (2002) distinguished three groups of countries regarding the stage of demographic transition in early 1990s: 1) countries in which demographic transition was not completed (Albania, Poland, Romania, Estonia, Macedonia, Moldova, Slovakia and FR Yugoslavia/Serbia and Montenegro), 2) countries that were about to reach the post-transitional stage (Belarus, Bosnia and Herzegovina, Latvia, Lithuania, Russia and Ukraine), and 3) countries in post-transition (Bulgaria, Hungary, Czech Republic, Croatia and Slovenia).

The end of the 20th century in post-communist countries was marked by a number of longstanding changes in all domains of life, including rapid expansion of university education in most countries and newly emerging lifestyles, which were not easily compatible with children and family. Consequently, the result was postponement of marriage and childbearing to higher ages. The end of the 20th and the beginning of the 21st century were marked by extremely low total fertility rates, which subsequently started to recover in most countries (Sobotka 2011). According to Sobotka (2011), the intensive shift of fertility and partnership formation toward higher ages were crucial for the fertility and marriage declines in the 1990s, but they were not given the appropriate attention in public debates and in the media. Regardless of numerous similarities in economic, social, and family trends in CEE after 1989, the region became extremely differentiated in terms of economic prosperity, social stability and economic transformation (Sobotka 2011; Nejašmić 2002).

At the beginning of the 21st century Croatia and Slovenia were faced with historically low birth rates and total fertility rates. These two neighbouring countries were once a part of the same country and were both among the most developed republics of former Socialist Federative Republic of Yugoslavia (Magaš 2013), and their demographic developments were, in some aspects, similar, but the recent demographic trends show some significant differences. Analysis of the official population statistics provided by the Croatian Bureau of Statistics and Statistical Office of the Republic of Slovenia reveal that one of the basic demographic differences today between these two countries is that Slovenian population has been increasing since late 1990s, while the Croatian population has been decreasing constantly since early 1990s. In this respect (along with the level of birth rates, share of births outside marriage, and immigration trends) demographic trends in Slovenia are more similar to those in western and northern European countries, while Croatia is more similar to many of the post-communist European countries.

2 Theoretical framework and literature preview

The recent changes in reproductive behaviour and marriage patterns in Croatia and Slovenia can be analysed through the prism of the Second Demographic Transition (SDT) theory. The basic idea of the SDT is that industrialised countries have reached a new stage in their demographic development, which is characterised by the extensive control over fertility. Namely, the couples tend to have one or two children, the fertility levels declined below the replacement level, and the childbearing is being postponed (Van de Kaa 2002). Lesthaege (2007) argues that the SDT also brings a multitude of living arrangements other than marriage and the disconnection between marriage and procreation. In Croatian case, the extensive control over fertility, low fertility levels and postponed childbearing have been present for several decades, but there is

still a significant connection between marriage and procreation. Similar characteristics have been observed in Slovenia too, but the connection between marriage and procreation is not as nearly significant as in Croatia.

In the last three decades, the decreasing number of births and falling birth rates have been the crucial determinants of demographic development in Croatia. At the beginning of each year, upon the publication of vital statistics for the previous year, the newspapers publish articles pointing out the »demographic catastrophe« referring to the decreasing number of births and marriages, low total fertility rate and increasing age of the mother at first birth. However, that issue has not been addressed enough in Croatian scientific literature, particularly recently. Most of the existing researches were focused on natural population change in general (e.g. Nejašmić 1986; 2000; Klempić and Lajić 2005), and two papers dealt with extramarital births in Croatia (Mrđen 1997; Pavić 2014). There is only one paper dealing with regional characteristics of birth rates in Croatia in the period 2001–2003 (Nejašmić, Bašić and Toskić 2008). Despite the fact that Croatia has had below-replacement total fertility rate since late 1960s, that issue has been investigated more thoroughly only recently, particularly the relation between women's employment and fertility (e.g. Akrap 2011; 2013; 2014; Akrap and Čipin 2011a; 2011b; Čipin 2010; 2011).

Similarly, in Slovenia, most of the researches discuss the birth rate trends, falling birth rates and population replacement. The research on marriages, age at first birth and at first marriage is scarce. Birth rates and fertility changes in Slovenia were discussed by Boh (1988), Stropnik and Šircelj (2008), Jakoš (2009), Malačič and Sambt (2014). The fertility issues in Slovenia were more thoroughly investigated by Josipovič, who focused on geographical factors of fertility (2003), general fertility-related issues in Slovenia (2004), the effects of migration on the changes in fertility behaviour (2006), the connections between the parents' education and fertility (2007), and the changes in birth rate and fertility levels (2014). There are also several researches dealing with fertility levels and parents' education (Černič Istenič 2007; Knežević Hočevar 2007; Stropnik 2007; Šircelj 2007). Vertot and Križman (2009) analysed the demographic situation in Slovenia through birth and death rates, and migration. Marital and extramarital births in Slovenia were discussed by Vodeb-Bonač (1991), Kričaj Korelc (2005), Strehovec (2012), and Kuhar (2013), who analysed the underlying causes of postponed childbearing and marriage, as well as the decreasing number of marriages and increasing trend of extramarital births. Kerbler (2015) analysed the spatial perspective of population ageing in Slovenia, and identified the falling birth rates as one of the most important causes of population ageing.

In both countries, the researchers emphasized the need for implementing population policies (e.g. Friganović and Šterc 1993; Akrap 2005; Wertheimer-Baletić 2005a; 2005b for Croatia, and Boh 1999; Stropnik and Šircelj 2008, and Malačič 2015, for Slovenia). Meanwhile, little has been done in that respect and the negative trends are continuing more rapidly than ever, prompting the need for further research.

The aim of this paper is to provide a comparative review of marriage and childbearing trends in Croatia and Slovenia through the analysis of the number of births, birth rates, extramarital births, total fertility rates, marriages, and mean age of the mother at first childbirth. The analysis encompasses the period from 1985 to 2017 in order to get a better insight into the trends before the collapse of the state socialist system and after.

3 Data and methods

The research relies on the official statistical data provided by the Croatian Bureau of Statistics and Statistical Office of the Republic of Slovenia for the period from 1985 to 2017. However, there are some differences in data collecting methodology in these two countries, but they do not have a significant impact on the final results. The data on tempo-adjusted total fertility rate were taken from the Human Fertility Database, but the time coverage is not equal for both countries – the data for Slovenia covers the period from 1984 to 2016, and for Croatia from 2003 to 2016. Accordingly, it is possible to compare this indicator from 2003 onward. The tempo-adjusted total fertility rate was calculated by using the Bongaarts-Feeney method (Bongaartsa and Feeney 1998). Due to the lack of data on completed cohort fertility for Croatia, it was not possible to make the comparison between the two countries.

The basic difference between population data collection in Croatia and Slovenia is that Slovenia has population register and Croatia does not, i.e. Croatia relies on population and housing censuses. The Slovenian population register is updated regularly, while Croatia conducts population censuses every ten years. Until

2001, all Croatian citizens were included in the total population, regardless of their actual residence, but from 2001, if they had been living outside the country for 12 or more months, they were not included, but the foreign citizens who lived in Croatia for 12 or more months were included (Croatian Bureau of Statistics 2013). The Slovenian methodology changed as well – the definition of total population changed three times. Until 1995, total population included persons with permanent residence in Slovenia. From 1995 until 2008, the population of Slovenia encompassed the citizens of the Republic of Slovenia with permanent residence in Slovenia, but excluded those that had been abroad for more than three months and gave notice of their departure. On the other hand, it included the foreigners who had registered permanent residence in Slovenia. As of 2008, a new definition has been used, and it is based on the usual residence concept (Statistical Office of the Republic of Slovenia 2018). For this reason, the population data is not always completely mutually comparable, but it does not have a significant impact on the analyses in this paper, particularly on marriage, mean ages and fertility indicators. The main method used in this paper is collection, analysis, visualisation and interpretation of the statistical data.

4 Results

The beginning of the 21st century in Croatia and Slovenia was marked by two divergent demographic processes – in Croatia, the population has been decreasing continuously, while the Slovenian population has been increasing and is at a historic high (Figure 1).

In early 1980s, Croatia entered the post-transitional stage of demographic transition and since early 1990s it has been characterised by constant natural decrease, which, coupled with intensive emigration, led to depopulation. Slovenia also entered the post-transitional stage in early 1990s, and was faced with natural decrease at the turn of the 21st century, but it recorded a period of gradual recovery afterward, which subsequently resulted in slight natural decrease at the very end on the analysed period (in 2017). However,

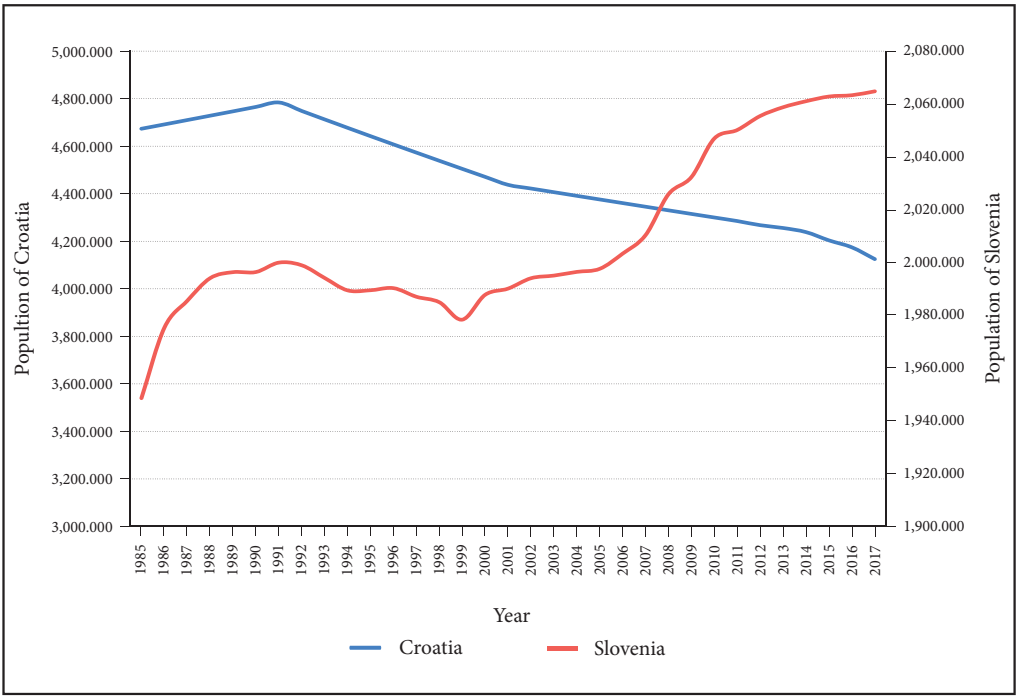

Figure 1: Population of Croatia and Slovenia, 1985–2017.

the most striking difference between the two countries in the analysed period is in international migration. Namely, Slovenia was, mostly, an immigration country, while Croatia was emigrational (Malačič and Sambt 2014), which is ultimately evident in their recent demographic development – population increase in Slovenia and population decrease in Croatia. Differences in immigration and net migration rates are closely related to the level of socio-economic development and Slovenia's accession to the EU in 2004 (Kogovšek Šalamon 2018). One of the factors that made the existing demographic situation in Croatia even more difficult during the 1990s was the Croatian War of Independence – its negative effects were particularly evident in the reduced number of marriages and births and in intensive emigration during and after the war.

Analysis of the birth rates from 1985 to 2003 indicate that both countries recorded a downward trend. The only exception in Croatia is a short-term baby boom after the Croatian War of Independence (in 1996 and 1997). After that, birth rates started increasing and peaked in late 2000s, before recording the downward trend again (Figure 2). Slovenia recorded a short-term baby boom in the second half of the 2000s, because somewhat more numerable generations born in late 1970s and early 1980s reached the reproductive age (Josipovič 2014). The birth rates in Croatia were, in most years, higher than in Slovenia up to mid-2000s, but from that point on, Slovenia has had higher birth rates than Croatia. An interesting fact is that throughout the whole analysed period, Slovenia had a higher share of women in child-bearing years than Croatia. This leads to conclusion that lower birth rates in Slovenia were the result of lower fertility rates. However, in both countries, the number of women in child-bearing years has been decreasing – from 1981 to 2017, their number in Croatia decreased by 22.4%, and in Slovenia by 7.7%. The reason for the lower intensity of decrease of women in child-bearing ages in Slovenia was immigration (Josipovič 2006). Namely, Slovenia has had positive net migration and notable immigration of women in child-bearing ages, while Croatia has been characterized by negative net migration and intensive emigration of population. Birth rate levels have had a significant impact on natural population change. In early 1990s, the natural population change in both countries reached the negative values, and in Croatia the downward trend continued,

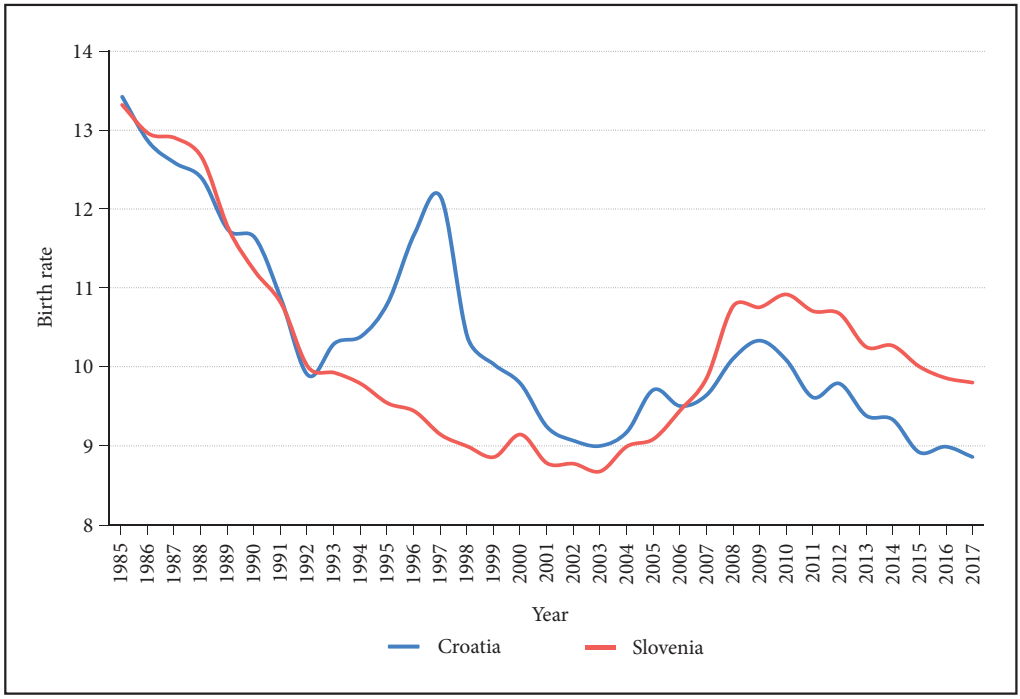

Figure 2: Birth rates in Croatia and Slovenia, 1985–2017.

reaching the history lowest value (in peaceful times) in 2017 (–4.1‰). On the other hand, the lowest values in Slovenia were recorded in late 1990s and early 2000s, and from 2006 to 2016 the natural population change was positive primarily due to the increase of the birth rates. However, the recent falling birth rates resulted in natural population decrease.

Another most evident difference between the two countries is related to births within and outside marriage (Figure 3 and Figure 4). At the beginning of the analysed period, in 1985, the share of births outside marriage in Slovenia was 19.1% and in Croatia 5.9%, while at the end, in 2017, that share in Slovenia reached 57.5% and in Croatia 19.9%.

This clearly shows that there is still a firm bond between marriage and childbearing in Croatia, and according to the data provided by Eurostat, Croatia is among the European states with the lowest share of births outside marriage. On the other hand, in Slovenia, the share of births outside marriage surpassed the share of births within marriage in 2007, and today, Slovenia is among the four countries in Europe with the highest share of births outside marriage (the top three countries being Iceland, France and Bulgaria). According to Oinonen (2008), the main reason for high proportion of extramarital births in Slovenia is that cohabitation was largely accepted even during the Communist era. It is also evident that the secularization has been more prominent in Slovenia than in Croatia (cf. Smrke and Uhan 2012).

Total fertility rate (TFR) is one of the basic indicators of reproduction. The onset of below-replacement fertility in Croatia can be situated in mid-1960s, while in Slovenia it occurred some 15 years later, at the very end of 1970s. However, throughout the last two decades of the 20th century and at the beginning of the 21st century, TFR was higher in Croatia than in Slovenia. During the 1980s, both countries experienced a decline of TFR below 1.80, heralding an era of long-term subreplacement fertility (Sobotka 2011). Additionally, both countries reached the historically low TFR in 2003 (1.33 in Croatia, and 1.20 in Slovenia), with the gradual recovery in the following years (Figure 5). From 2008, TFR has been higher in Slovenia than in Croatia, and it is currently at 1.62 children per woman.

Since total fertility rate is a synthetic rate that does not take into consideration other demographic determinants of fertility than age, it is advisable to complement it with tempo-adjusted total fertility rate and cohort fertility data in order to get a better insight into the fertility levels. However, there is no data on cohort fertility data for Croatia, so it is not possible to make a comparison with Slovenia, and the tempo-adjusted total fertility rate for Croatia is only available since 2003. Nevertheless, the data reveal that, with the exception of 2015, the tempo-adjusted total fertility rate in Croatia has been higher than in Slovenia (Figure 6). The tempo-adjusted total fertility rate is a better indicator for the average number of children per woman than the observed TFR, because it takes into consideration the birth order specific changes (i.e. its calculation requires only age-specific fertility rates by birth order), while the TFR is affected by tempo effect (i.e. by distortions due to changes in the timing of births) (Bongaarts and Feeney 1998). It is evident that the both countries have experienced »postponement transition« (shift of childbearing to older ages) (Sobotka 2017), but if we eliminate the tempo effect, the tempo-adjusted rate reveals that the fertility rates are somewhat more favorable in Croatia. However, it is not possible to draw concrete conclusions due to short time span covered. It is interesting to note that the tempo-adjusted total fertility rates are very often higher than total fertility rates. According to Josipovič's (2014) calculation for Slovenia, from 1954 to 1979, the fertility rates were overestimated by +0,2 to +0,5 children per woman, and from 1980 onwards, they were underestimated by –0,3 to –0,4 in the period from 1991 to 2004, and by –0,2 from 2005.

Changes in fertility levels are closely connected to the timing of marriage and childbearing. In both countries, there has been a significant increase in the average age of women at first marriage and at first childbirth (Figure 7 and Figure 8). At the beginning of the analysed period, the women in both countries entered the first marriage at the age of 22.8, and gave birth to the first child at the age of 23.8 (in Croatia) and 23.2 (in Slovenia). In the course of the following 32 years the average ages in Croatia increased to 28.6 and 28.9, and in Slovenia to 30.1 and 29.4. The major difference between the two countries is that in Croatia the average age at childbirth has been constantly higher than the average age at first marriage, which indicates that marriage usually precedes childbearing. On the other hand, in Slovenia, there is no particular gap between the two average ages, and approximately in the last two decades, the average age at first marriage has been higher than at first childbirth (with the exception of 2009 and 2010, when the age at first childbirth was slightly higher).

It is evident that in the analysed period there was a significant shift of the timing of childbearing from early 20s to late 20s and early 30s, and the age-specific fertility rates decreased, particularly in the most

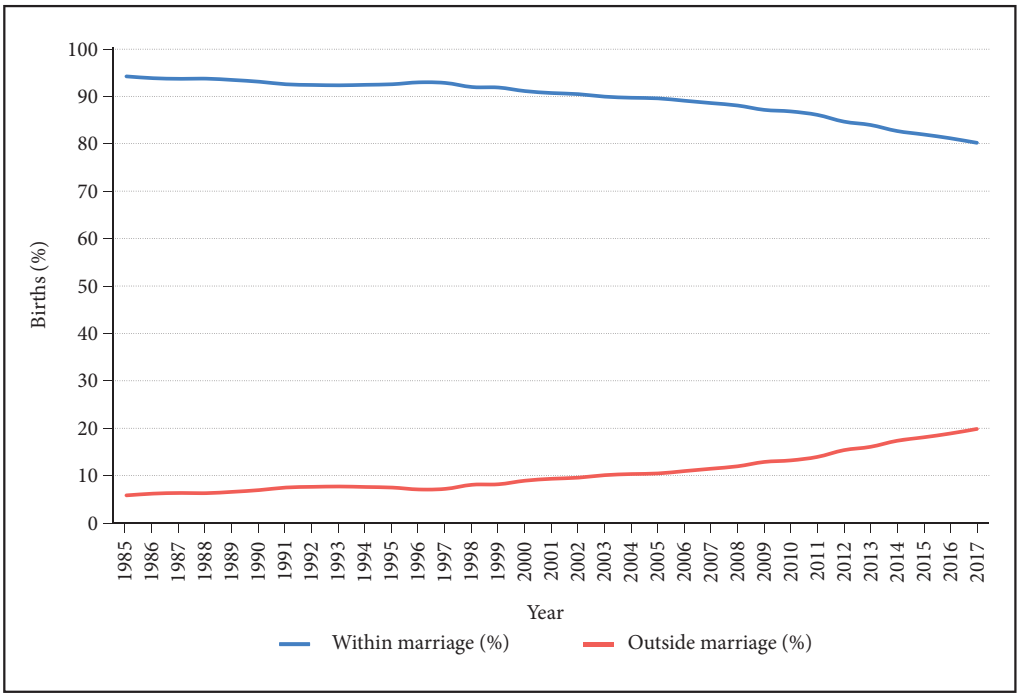

Figure 3: Births within and outside marriage in Croatia, 1985–2017.

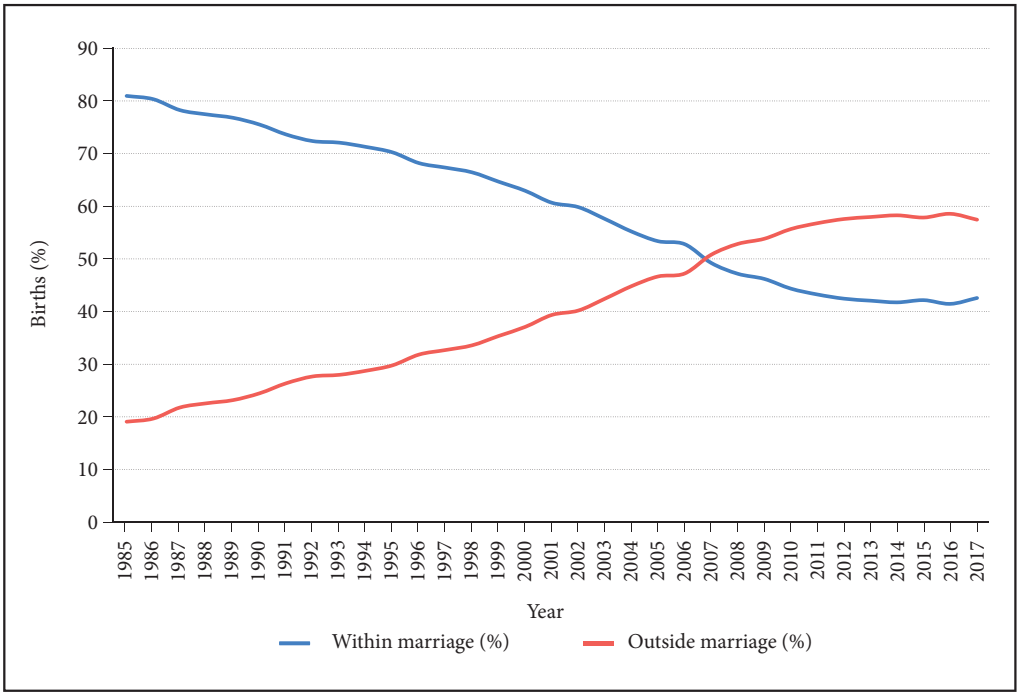

Figure 4: Births within and outside marriage in Slovenia, 1985–2017.

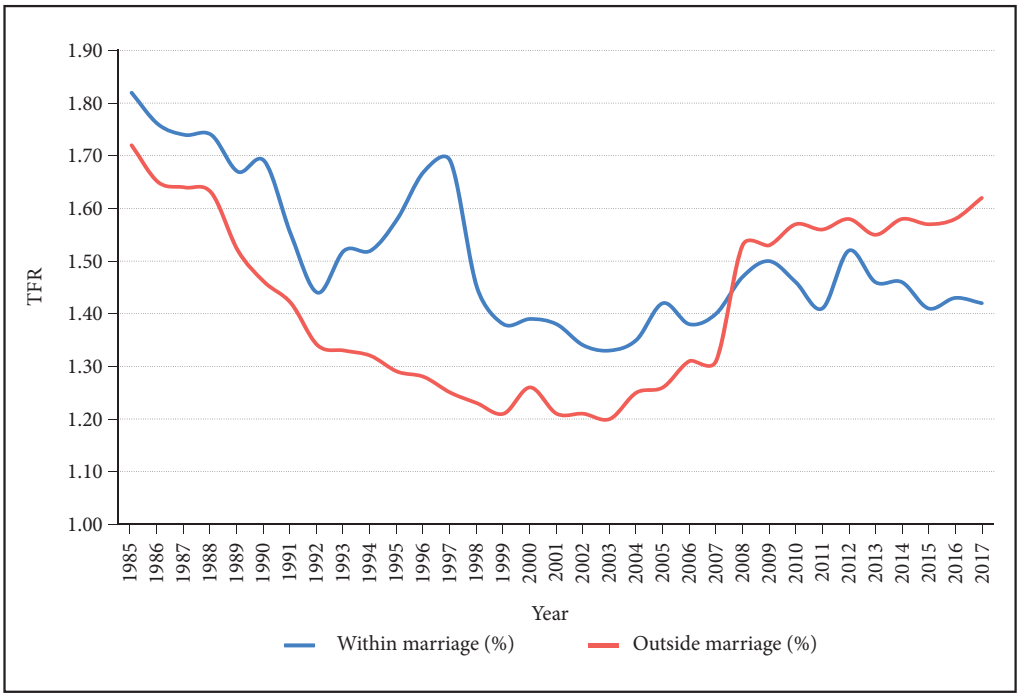

Figure 5: Total fertility rate (TFR) in Croatia and Slovenia, 1985–2017.

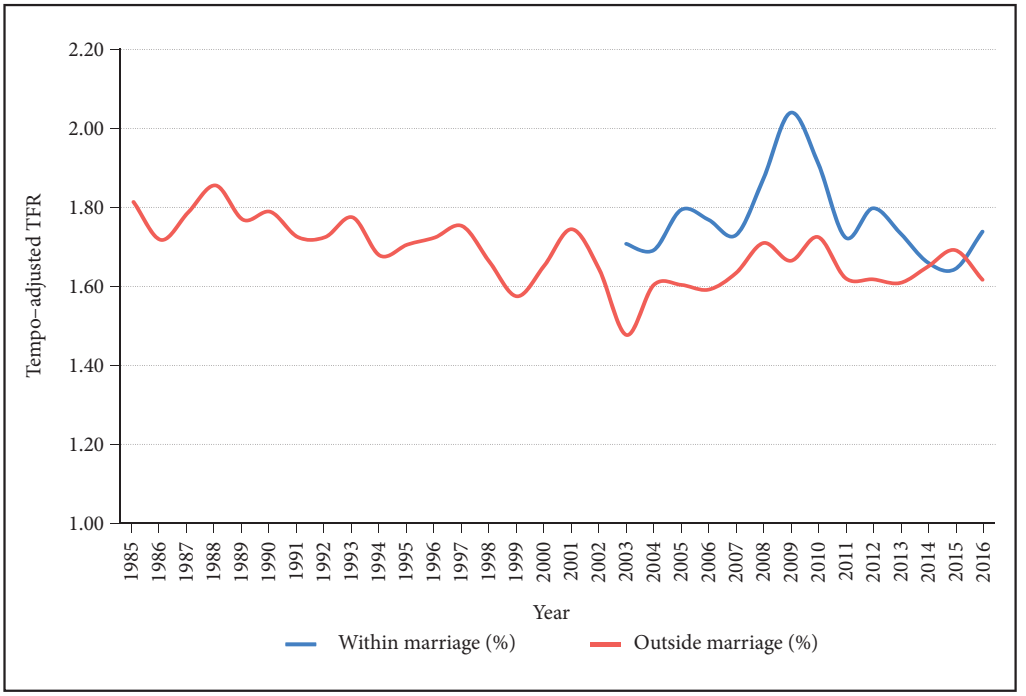

Figure 6: Tempo-adjusted total fertility rate in Croatia (2003–2016) and Slovenia (1985–2016).

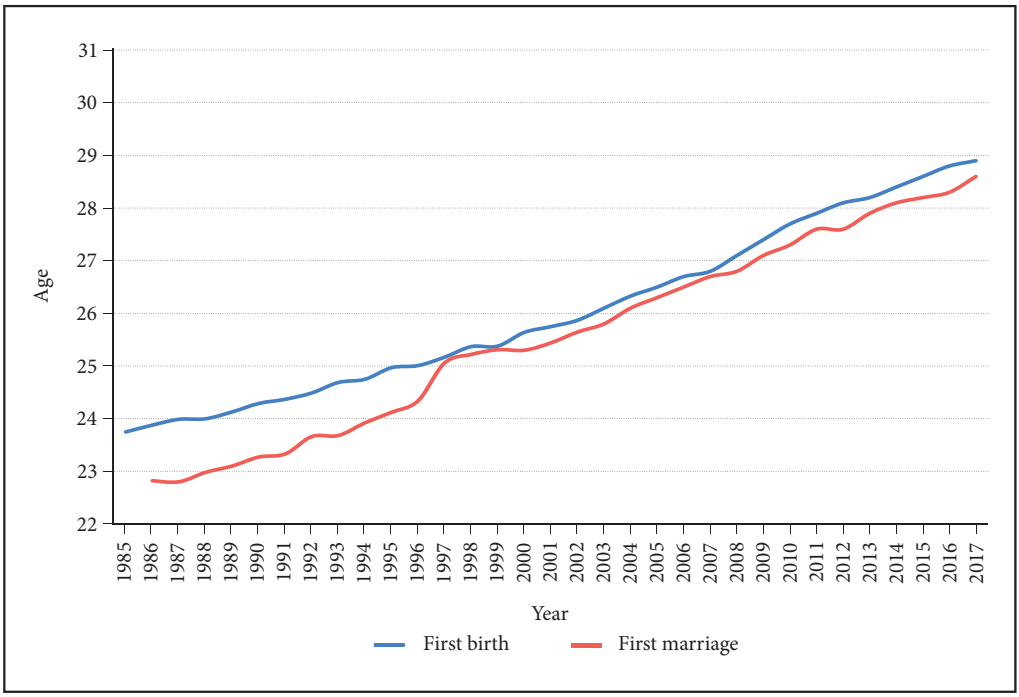

Figure 7: Average age of women at first marriage and at first childbirth in Croatia, 1985–2017.

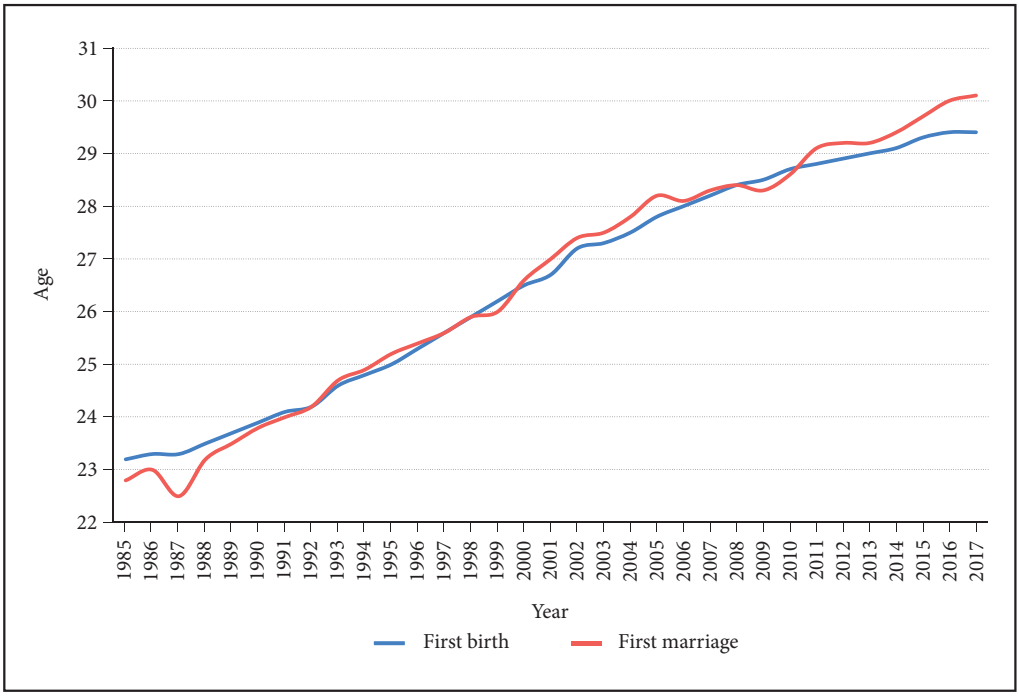

Figure 8: Average age of women at first marriage and at first childbirth in Slovenia, 1985–2017.

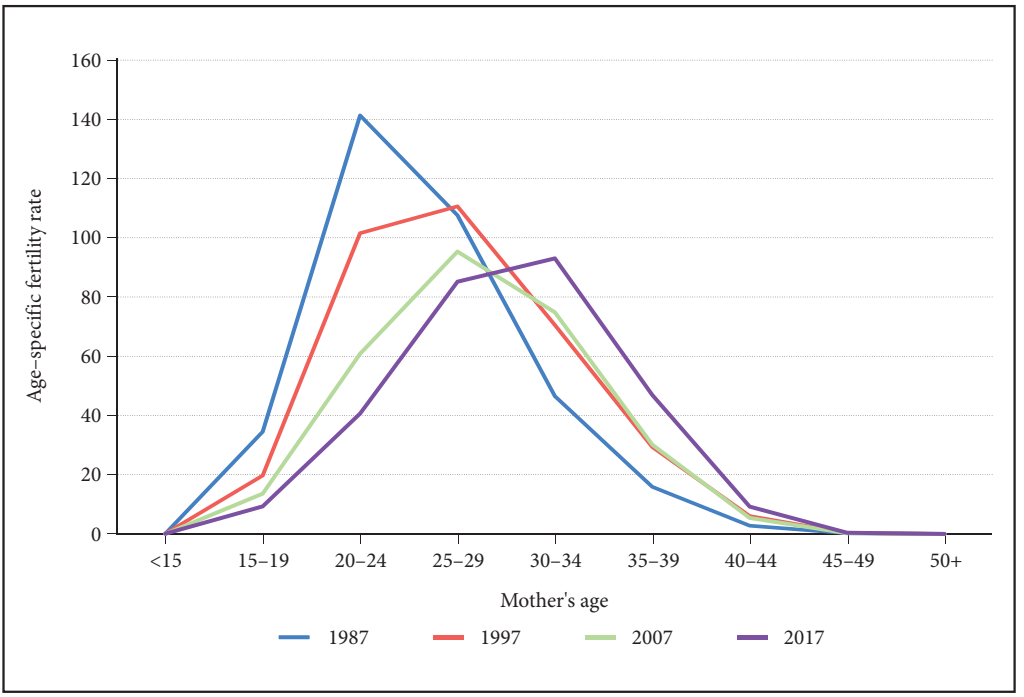

Figure 9: Age-specific fertility rates in Croatia in selected years.

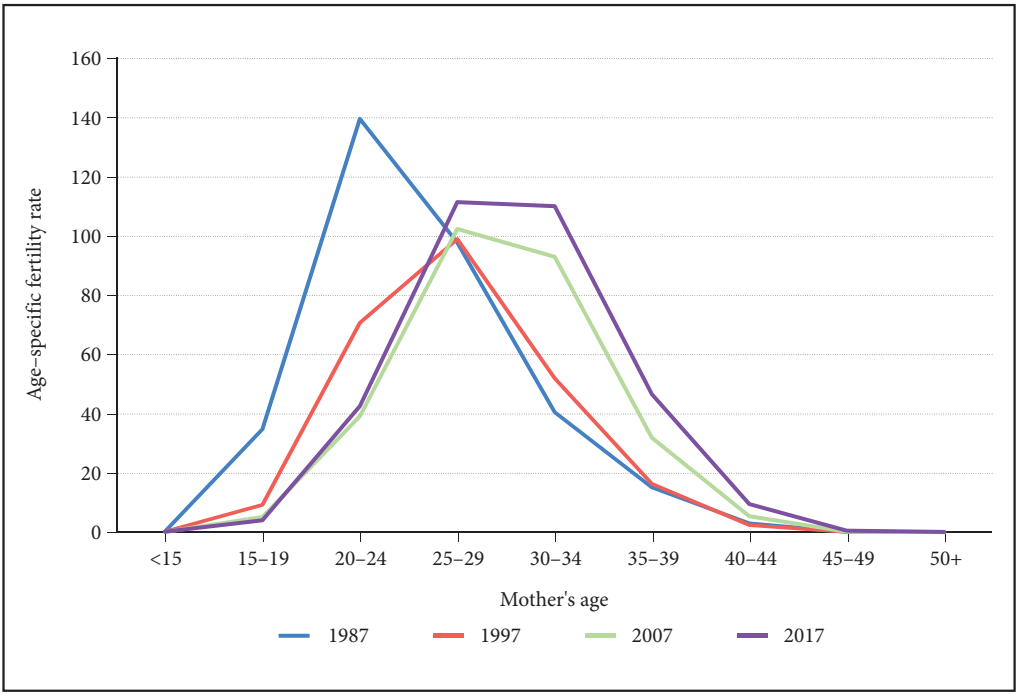

Figure 10: Age-specific fertility rates in Slovenia in selected years.

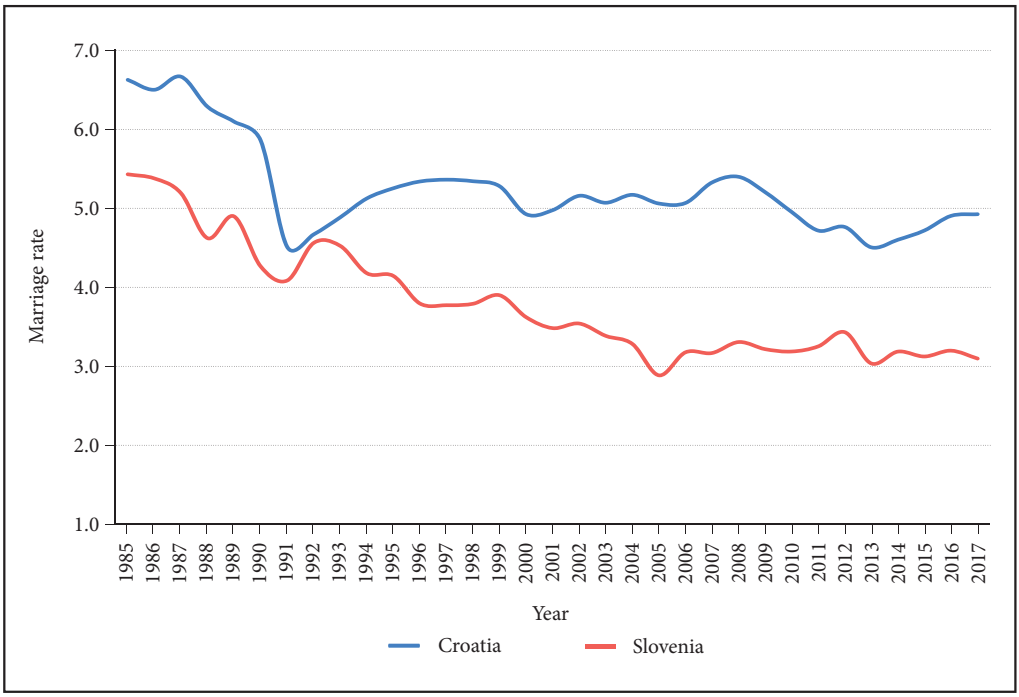

Figure 11: Marriage rates (marriages per 1,000 inhabitants) in Croatia and Slovenia, 1985–2017.

fertile age group (Figure 9 and Figure 10). In 1987, the age-specific fertility rates were the highest in the age group 20–24 (141.2 in Croatia and 139.6 in Slovenia), but in 2017 the rates in that age group decreased to 40.6 in Croatia and 42.6 in Slovenia. Moreover, in 2017, the age group 20–24 had the lowest fertility rate in comparison to the age groups 25–29, 30–34 and 35–39.

In 1997 and 2007, in both countries the highest age-specific fertility rates were recorded in the age group 25–29, but in 2017 the fertility in Croatia was the highest in the age group 30–34. On the other hand, in Slovenia the highest fertility was still in the age group 25–29 (but only slightly higher than in the age group 30–34; 111.5 and 110.1, respectively), and it even increased in comparison to the previous two years. The conclusion that the timing of childbearing in both countries shifted to older age groups is further supported by the fact that from 1985 to 2017 the fertility in the age group 15–19 was decreasing continuously, with simultaneous increase of fertility among the women aged 40–44.

The analysis of marriage rates indicates that the importance of marriage as a union is decreasing. In the analysed period, the marriage rates decreased, but there is still a difference between the two countries. In Croatia, the rate is currently at almost five marriages per 1,000 inhabitants, and in Slovenia just over three marriages per 1,000 inhabitants (Figure 11). From 1985 to 2017, the number of marriages in Croatia decreased by 34.4% and in Slovenia by 38.7%.

5 Discussion

In most cases, childbearing was traditionally associated with marriage, and extramarital births comprised only a small portion of total live births. According to the church and other historical records in Europe, from 16th to 19th century, the non-marital childbearing (»illegitimacy ratio«) ranged from approximately 2 to 7 per cent in most countries (Laslett, Oosterveen and Smith 1980, cited in Perelli-Harris et al. 2010). Throughout the 20th century, marriage was a dominant form of union between a man and a woman, and

1960s and 1970s were the »golden age of marriage« across many Western nations (Kiernan 2001), as well as in Croatia (Mrđen 1997) and Slovenia (Stropnik and Šircelj 2008). In Slovenia and Croatia, the number of marriages started decreasing in mid-1970s and late-1970s, respectively. The lower marriage rate in Slovenia can be attributed to the changes in attitudes toward traditional, religious and moral perception of marriage. Namely, the period after the Second World War was marked by significant changes – exclusion of the church from the schools, media and public life, better access to contraception, and cohabitation among the younger generations (Strehovec 2012). Another important factor is the fact that a significant number of young people continue living with their parents even after they complete their studies, thus postponing marriage and forming their own families (Kuhar 2013). In Croatia, that process started somewhat later, as the influence of the church and the religion has been stronger.

It is important to emphasize that the decrease in fertility level, as well as other changes in demographic behaviour, had started years or even decades before the political, economic, and social transition that started in the late 1980s and early 1990s (Stropnik and Šircelj 2008), which makes Slovenia and Croatia fairly different from most former socialist countries. Of course, it cannot be ignored that the political and economic transition in the early 1990s had a significant impact on demographic changes during the 1990s and early 2000s. Some of the most notable reasons for the significant fall in the number of live births and birth rates were definitely intensive industrialisation and urbanisation, which influenced the reproductive behaviour of the population resulting in lower fertility rates (Breznik 1988, cited in Josipovič 2004; Černič Istenič 2009). Namely, the period from early 1960s to early 1980s in Croatia and Slovenia were characterised by intensive industrialisation (Vrišer 1992; Nejašmić 2008), during which there was an increased demand for labour force, particularly in labour-intensive industries. Such demand prompted a significant emigration from rural to urban areas and the increase of women labour force. Additionally, women's educational and career aspirations increased.

The researches have shown that prolonged education contributes to postponing the childbearing (Liefbroer and Corijn 1999; Baizán et al. 2003; Lappegård and Rønsen 2005). The same trend can be observed in Croatia and Slovenia, too. Namely, the analysis of the number of women enrolled at higher education institutions in both countries has increased significantly since the mid-1980s (Stropnik and Šircelj 2008; Croatian Bureau of Statistics 2018). Simultaneously, the birth rates and fertility decreased significantly. Active participation in labour force also contributed to delaying marriage and childbearing. Additionally, due to economic insecurity in post-socialist and transitional economies, there was a strong need for investing in one's own education and career thus postponing marriage and pregnancy (Čipin 2011). Although, at the national level, highly educated women in Slovenia generally have fewer children than the women with lower levels of education, a research conducted by Josipovič (2007) revealed that in some parts of the country the women with higher education tend to have more children than the women with lower level of education. On the other hand, a research conducted in Croatia by Čipin (2011) showed that the women who attained tertiary education had fewer children than women with elementary or secondary education, but their desired number of children is higher than in women with lower levels of education.

Although there is no unanimous scientific evidence that links declining fertility and reduced number of live births with the periods of economic recession (Lanzieri 2013), there is evident decline in the number of live births in Croatia since the beginning of the economic recession in 2008, and similar trends were observed in a number of other European countries, particularly in Southern, Eastern and Central Europe (Goldstein et al. 2013). The changes in reproductive behaviour in that period have been prompted by increased unemployment of young adults and economic uncertainty. For the same reason, young people tend to postpone marriage. However, it is also important to emphasise the negative effects of emigration from Croatia, which has intensified since the beginning of the crisis, particularly because most of the emigrants have been young adults in their reproductive age. In conclusion, we can say that Croatia has been faced with, as Lanzieri (2013) calls it, baby recession. Although the number of births and fertility rates have been declining since the mid-1980s, they have recently reached the unprecedented levels. The situation regarding childbearing has been alarming for the past 25 years, and in 2006, the National Population Policy was adopted in Croatia (Nacionalna populacijska politika 2006). The policy largely focused on introducing favourable housing policies for the young people and families with small children, better employment opportunities, reducing emigration of young population, at family allowances, tax reliefs, on full-time employment and flexible working hours, particularly of mothers, better child care opportunities etc. Despite the policy, little has been done (Akrap 2019), and the number of live births each year has been decreasing constantly.

The state also failed to mitigate the negative impact of economic conditions on fertility by introducing family policies that might have softened the adverse effects of the crisis.

On the other hand, such decline in the number of births after 2008 was not present in Slovenia. Some of the most notable reasons are less pronounced effect of the economic crisis and immigration. Namely, as much as 73% of the women who have immigrated to Slovenia since 2000 are aged 20–39. Additionally, some of the family policies and measures in Slovenia probably yielded certain results, particularly those related to the mothers' labour market participation, maternity and paternity leave provisions, early childhood education and care, health care, housing etc. (Stropnik 2014). In the last few years, Croatia has recorded the lowest number of births ever, while the latest data on the number of births in Slovenia show that it is still above the all-time lowest recorded in 2003.

6 Conclusion

Although Croatia and Slovenia were once a part of the same state and, to an extent, experienced similar political, economic and social changes in that period, their demographic features have not been as similar in some respects. One of the major differences today is that Slovenia has had population increase since 2000, a Croatia has been depopulating since 1991. The population increase in Slovenia can be attributed to low, but positive natural population change and positive net migration. On the other hand, Croatia has been faced with a long-term negative natural population change and negative net migration. Another major difference is related to marriage rate and extramarital births – in Croatia, the marriage rate is higher and as much as 80% of the children are born within marriage, while in Slovenia, the marriage rate is lower, and the share of extramarital births is much higher than in Croatia.

As for the other indicators, the trends are more similar, but the birth rate, total fertility rate, and age-specific fertility rate are still more favourable in Slovenia. It is evident that the mean ages at first marriage and first childbirth have been increasing constantly, and the age at first childbirth is above 28 in Croatia and 29 in Slovenia. This can be attributed to prolonged education of both sexes, job insecurity and increasing real estate prices, which prevents the younger generation from leaving parental home earlier. Both countries are faced with great demographic challenges, and there is a strong need for introducing more effective policies and measures aimed at increasing the fertility levels, particularly by removing the obstacles that prevent the young people from having children earlier (this includes much better housing opportunities for young adults, more generous family allowances and tax reliefs, better child care system, part-time employment and flexible working hours, job security, etc). However, one must bear in mind that it will be difficult to achieve, considering the fact that the number of women in childbearing age has been decreasing.

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THE IMPACT OF LARGE DAMS ON FLUVIAL SEDIMENTATION: THE IRON GATES RESERVOIR ON THE DANUBE RIVER

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IONUȚ SĂVULESCU

General view of the Cerna Gulf area.

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The impact of large dams on fluvial sedimentation: The Iron Gates Reservoir on the Danube River

ABSTRACT: Dam construction is one of the major human pressures impacting fluvial processes, including topography and hydro-sedimentary flows, as a result of the change in flow regime from fluvial to fluvial-lacustrine. This paper investigates geomorphic changes at Iron Gates I, the largest reservoir on the Danube River, completed in 1972 for hydropower and navigation. The study focuses on a gulf area that emerged at the mouth of the Cerna River into the reservoir, highlighting spatial changes in topography and sediment distribution, based on a diachronic analysis of two datasets before and after the dam was built: one extracted from historical topographic maps and the other obtained from a bathymetric echo sounding survey, integrated within a GIS analysis. The results reveal the dominance of the sedimentation process, with an alluvium layer thickness up to 14 m. The current sediment pattern has changed the submerged morphology, leading to the formation of an alluvial fan at the mouth of the Cerna River and of a sedimentary bar between the Cerna Gulf and the Danube River's channel. The siltation process together with the current underwater morphology limits ship traffic and the storage capacity of the reservoir.

KEY WORDS: hydropower dam, Iron Gates reservoir, sedimentation, topography, Cerna Gulf, Danube River

Vpliv velikih jezov na rečno sedimentacijo: Primer zajezitve Železna vrata na Donavi

POVZETEK: Gradnja jezov je eden največjih človeških pritiskov, ki zaradi spremembe pretočnega režima iz rečnega v rečno-jezerskega vplivajo na rečne procese, vključno s topografijo in vodno-sedimentnimi tokovi. Namen prispevka je raziskati geomorfne spremembe znotraj zajezitve Železna vrata I, največje zajezitve na reki Donavi, ki je bila dokončana leta 1972 in je namenjena proizvodnji hidroenergije ter plovbi. Študija se osredotoča na zaliv, ki je nastal ob izlivu reke Cerne v akumulacijsko jezero, s poudarkom na prostorskih spremembah v topografiji in razporeditvi usedlin. Raziskava temelji na diahroni analizi dveh nizov podatkov pred in po zgradbi jezu: prvi je bil izvzet iz zgodovinskih topografskih zemljevidov, drugi pa pridobljen z batimetrično sonarsko raziskavo, integrirano v GIS okolju. Rezultati razkrivajo prevlado sedimentacije z debelino aluvialnega sloja do 14 m. Sedanji vzorec sedimenta je spremenil potopljeno morfologijo, kar je povzročilo nastanek vršaja ob ustju reke Cerne in sedimentnih nanosov med zalivom Cerna in Donavo. Proces siltacije skupaj z današnjo podvodno morfologijo omejuje ladijski rečni promet in tudi sedimentno zmogljivost akumulacije.

KLJUČNE BESEDE: jez hidroelektrarne, akumulacija Železna vrata, sedimentacija, topografija, zaliv Cerna, reka Donava

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1 Introduction

The construction of large dams and reservoirs has many and complex environmental, economic, and social impacts (Hohensinner et al. 2011; Zhang et al. 2016). Among the major consequences are alterations of hydro-sedimentary flows and geomorphic changes, both upstream and downstream from the dam (Brandt 2000; Zhou et al. 2011; Čanjevac and Orešić 2018; Li et al. 2018). Therefore, as a result of the transition from a fluvial to a fluvial-lacustrine flow regime upstream from the dam, sediment retention and shore abrasion processes become dominant (Petkovic, Dragovic and Markovic 1999; Repnik Mah, Mikoš and Bizjak 2010; Vukovic, Vukovic and Stankovic 2014). Generally, sediment distribution into reservoirs is related to erosion and accumulation processes (Zahar, Ghorbel and Albergel 2008), influenced by the incoming flow and sediment load, as well as the bottom morphology and the water level (Evrad et al. 1985). On the other hand, downstream from the dam, the liquid and solid flows considerably decrease, fluvial erosion intensifies, and the riverbed changes from a depositional regime from before dam construction to an erosional one (Castillo et al. 2007; Li et al. 2016).

The Iron Gates I (IG I) dam, known as *Porțile de Fier I* in Romanian and *Djerdap* in Serbian, is 1,278 m long and 60 m high. It was built about 900 km from the mouth of the Danube River at the Black Sea, mainly for hydropower and flood control, as well as to improve river transportation conditions in the Iron Gate Gorge area (Netzband 2007) between Romania on the north side and Serbia on the south side (Figure 1). Upstream from the IG I dam a reservoir more than 140 km long was formed, covering an area of about 100 km^2 and storing a volume up to 2.4 km^3 at the maximum retention level of 69.5 m (Aquaproiect 1992; Pop 1996). The hydropower plant has a total installed power of 2,136 MW, which is shared equally between the neighboring countries, Romania and Serbia (Pop 1996).

After it attained operational level in 1972, the IG I reservoir strongly affected the hydro-sedimentary flows and processes upstream and downstream from the dam. Upstream from the dam, the water level rose by about 30 m and the fluvial regime turned into a fluvial-lacustrine regime. Before the construction of the reservoir, the Danube River had high water levels in the spring and low levels in the fall, but later the water level and discharge regimes were strongly influenced by exploitation of the reservoir. As a result of the regulatory flow function of the reservoir, the discharge increases during low-water periods (in winter and fall), and it decreases during high-water periods in order to mitigate flood magnitudes (Zaharia 2010).

Regarding sediments, it is estimated that the IG I reservoir retains up to 77% of the suspended sediment volume supplied by the Danube River (Panin and Jipa 1998; Teodoru and Wehrli 2005; Babic Mladenovic et al. 2017). The sediments are deposited in layers of variable thickness, depending on the bottom morphology, the incoming flow velocity, and the underwater stream distribution (Evrad et al. 1985). The sedimentation process is more intensive within the small inlets or gulfs formed at the tributaries' mouths, as well as at the reservoir tail and in low areas where the flow is slow (Rădoane and Rădoane 2005). In some inlets with low flow rates (e.g., at Dubova and Svinița), the sediment layer exceeds 11 m in thickness (Zaharia 2010). The alluvium retention in the IG I reservoir had a direct effect on sediment reduction in the Danube Delta (Panin and Jipa 2002; Giosan et al. 2014; Constantinescu et al. 2015; Oaie et al. 2015). The annual average volume of suspended sediment supplied by the Danube River in its delta decreased by more than 50% after construction of the IG I dam (Zaharia et al. 2011; Zaharia and Ioana-Toroimac 2013).

This paper investigates the geomorphic changes induced by development of the IG I reservoir, as well as the spatial distribution and the dimension of sediment deposits, in order to provide useful information for reservoir management. The study focuses on the Cerna Gulf area, located north of the main stream of the Danube, in Romania, about 20 km upstream from the dam. This is the first study focusing on the Cerna Gulf, an important area in terms of economic activities at IG I reservoir, where the ship-building industry and river transportation are dominant activities.

2 Material and methods

2.1 Study area

The Cerna Gulf is located in a mountainous area in Iron Gates Natural Park (Figure 1), between kilometers 953 and 955 from the mouth of the Danube. It was artificially formed after construction of the IG I dam,

when water accumulated in the reservoir flooded the floodplain and the lowest terraces of the Danube Valley. The Cerna River is the largest tributary of the Danube in this area, with a length of 87 km and a catchment area of 1,360 km² (Aquaproiect 1992). It has an annual average flow rate of about 20 m³/s and it carries about 3 kg/s of suspended sediments (Sârbu 2001). Before the reservoir was built, the Cerna River flowed into the Danube near the old town of Orșova, which developed on the floodplain and the two lowest terraces. Today this area is covered by water. The old confluence point was located 4 km downstream from the current position. The Cerna Gulf extends over almost 500 hectares and reaches a depth of 24 m. It is almost 3.4 km long and about 1.4 km wide. The gulf is surrounded by hills with elevations up to 460 m and slopes up to 50 degrees, formed by easily erodible sedimentary rocks, clays, marls, sands, and gravels. The lithology and the morphometry of this area is favorable for the occurrence of many morphodynamic processes, such as sheet erosion and landslides. Gully erosion is also widespread during the heavy rains of the early summer season. The materials eroded from the surrounding slopes, as well as those resulting from the abrasion processes, contribute to siltation of the gulf, affecting local economic activities, including the shipyard and the port.

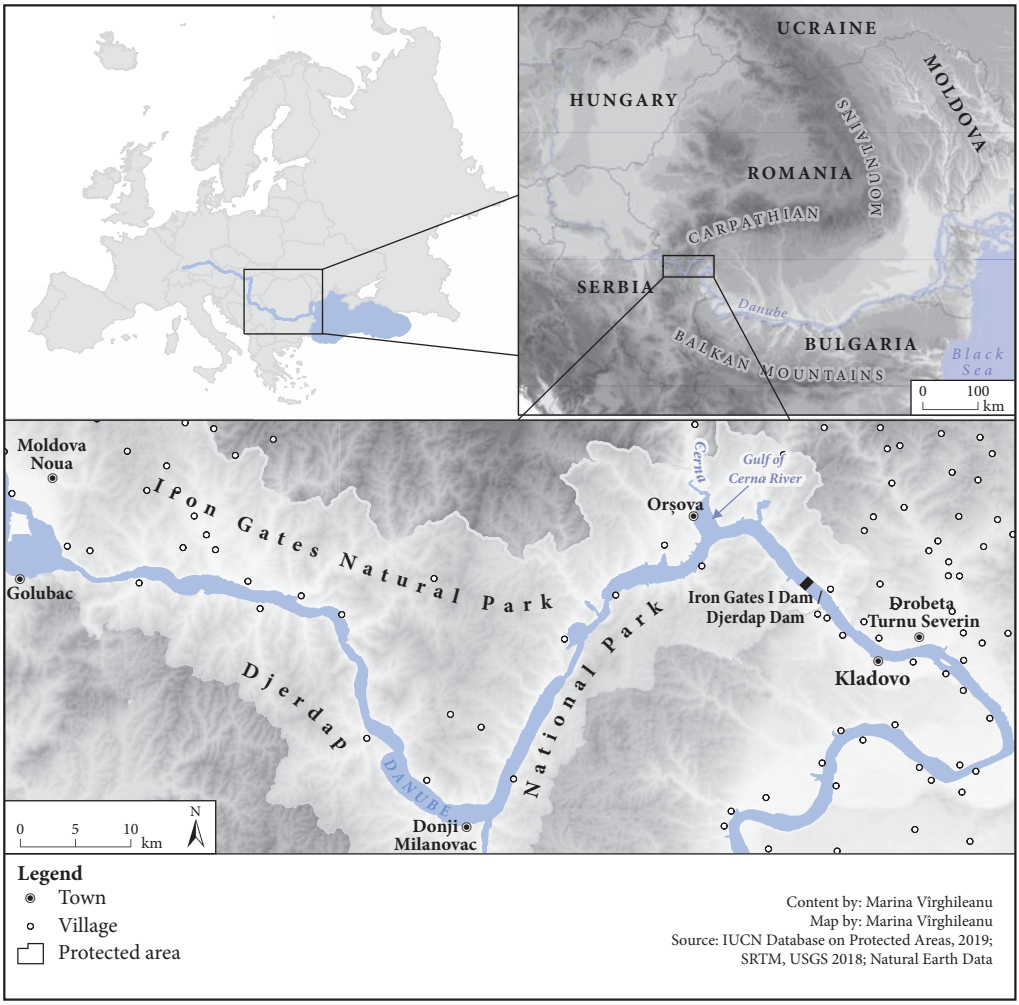


Figure 1: Location map of the study area.

2.2 Data and methods

The analysis follows two directions: reconstruction of the topography before the flooding of the Cerna Valley as a result of the formation of the IG I reservoir, and modeling the current submerged morphology within the Cerna Gulf. Based on these approaches, the changes in submerged morphology were revealed through a diachronic analysis (Figure 2).

The reconstruction of the former topography before the construction of the reservoir was based on military topographic maps at a 1:20,000 scale from 1939 (Romanian Army Shooting Map 1939) and 1:25,000 scale from 1952, edited by the Military Mapping Directorate (DTM). These maps were used to extract vector data representing contours at a 10 m interval, elevation points, and the stream network. These datasets were integrated into a spatial interpolation to obtain the Digital Elevation Model (DEM) of the study area. CORONA KH-4B satellite images from 1968 (Mihai, Nistor and Simion 2016) and the geomorphic map from the Iron Gates Atlas (Posea, Grigore and Popescu 1976) were used to map the old floodplain microlandforms.

The current submerged topographic model was generated using bathymetric measurements collected with an echo sounder instrument. The survey was performed during two field campaigns, on March 29th and October 25th, 2017, following previously drawn boat tracks. These 33 transects, with an interval of 100 m, were perpendicular to the former Cerna River's channel direction. Throughout those transects, the water depths were measured every 10 m, using a Garmin GPS map 298 single-beam sounder (Table 1). The sounder was sunk into the water at a depth of 0.30 m and set at a cone angle of 10° with a 200 kHz signal frequency for a clear view. Route coverage control was accomplished using the GIS MapPlus / iPhone 6s application with an accuracy of 2 to 3 m at an average boat speed of 10 km/h. The interconnected GPS/EGNOS system

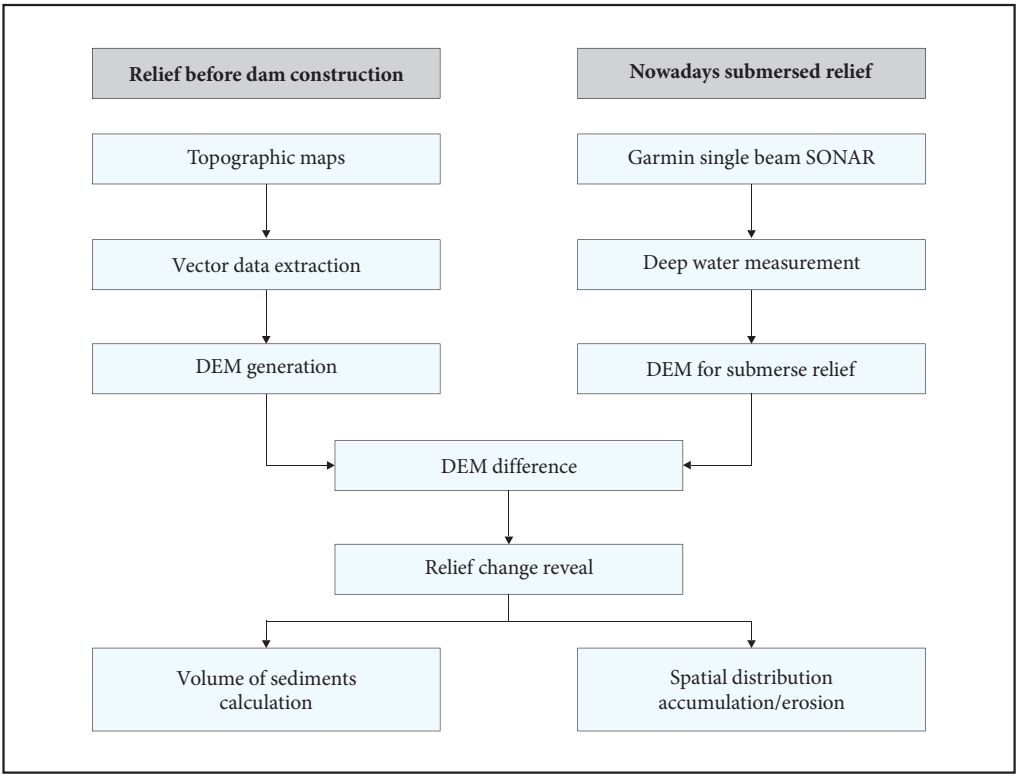


Figure 2: Workflow of the analysis.

provided the *xy* coordinates for each measurement in the GCS/WGS 84 coordinate system. In order to increase the data density during the measurements, another 1,351 observation points were manually recorded. All the data collected during the field surveys comprises 5,551 measurement points.

The values measured during both time periods were correlated with the variation in the water level of the Danube (Table 2) provided by the River Administration of the Lower Danube, a subsidiary of the Drobeta Turnu-Severin Navigable Way Agency (AFDJ) (River Administration of the Lower Danube 2017).

Table 1: Echo sounding survey parameters used for data collection during field surveys for bathymetric measurements.

Data	March 29th, 2017	October 25th, 2017
Boat speed	9 km/h	8 km/h
Number of observations	3,235	2,316
Track length	31.9 km	13.7 km
Measurement time	3h 33'	1h 50'
Area covered	400 ha	140 ha
Distance between point observations	10 m	10 m
Offset	0.3 m	0.3 m

Table 2: Reference values used for bathymetric data calibration.

Data	March 29th, 2017	October 25th, 2017
Black Sea – Sulina/Constanța correction	+0.224 m	+0.224 m
Daily water level	68.744 m	69.444 m
Water level correction	+0.7 m	–

The elevation of the corresponding points for the submerged landforms was calculated as the difference between the corrected water level and the measured water depths, using the formula $H = W_l - W_d$, where H = elevation of the submerged topography (in m), W_l = daily water level (in m), and W_d = water depth (in m).

The daily water level values (W_l) for the first field survey, obtained from the AFDJ authority, were calibrated with the difference measured during the second survey. The water depth values were also corrected with the offset values adapted to the depth at which the sounder was sunk into the water. Then the elevation of the submerged topography (*H)* was correlated with the sea level value difference between the Sulina and Constanța reference points on the Black Sea coast (Table 2).

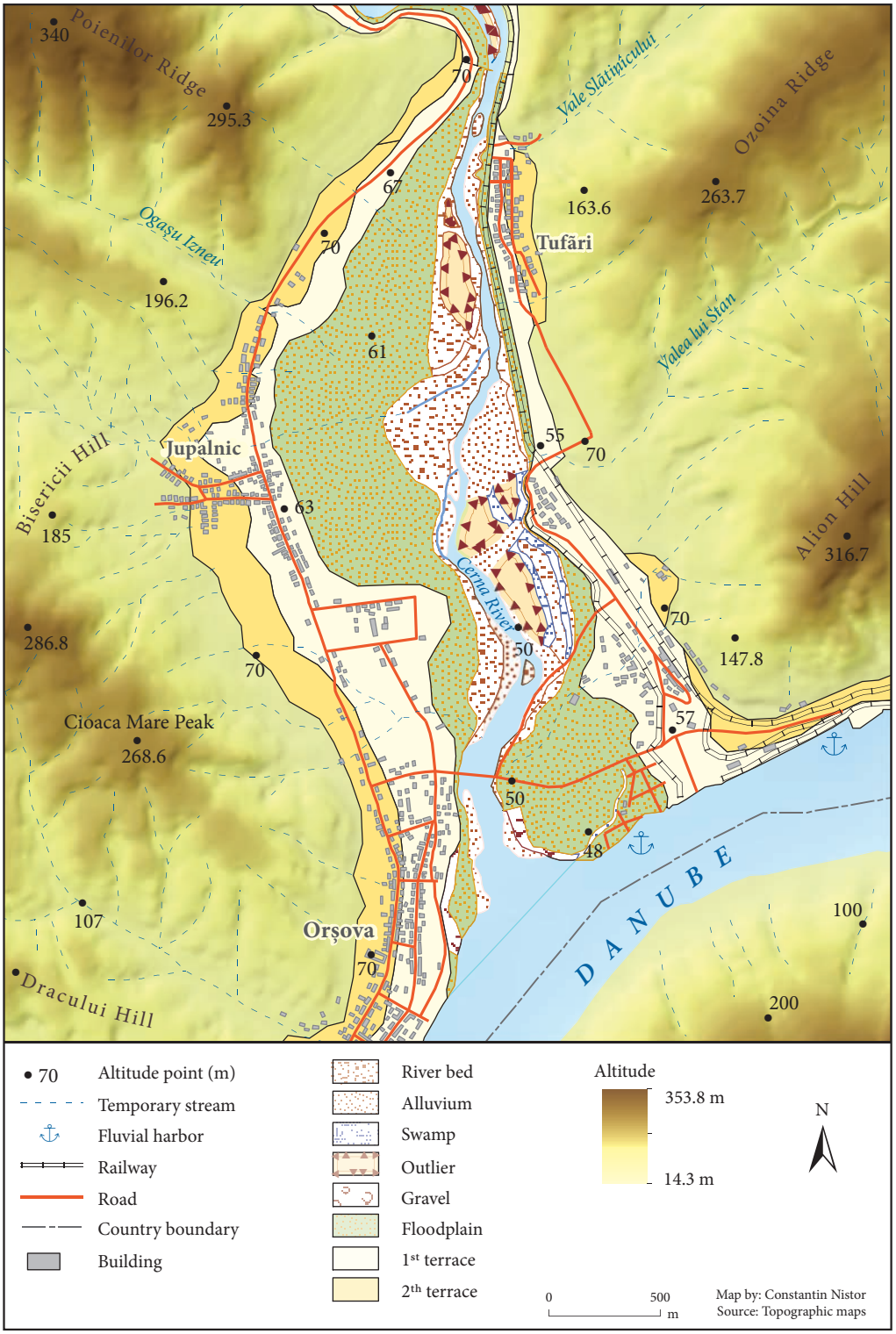
The topographic changes caused by development of the IG I reservoir were obtained as the difference between both elevation models: the first corresponding to the former topographic configuration (1939) and the second produced with the help of the in situ measurements of the submerged topography (2017).

The changes in the topography were highlighted within three cross-profiles from representative sectors of the Cerna Gulf, based on data extracted from the 1939 topographic map and on bathymetric measurements from 2017. These profiles show the spatial magnitude of the erosion and accumulation processes.

3 Results

The primary topography, prior to the formation of the IG I reservoir, was shaped by the Cerna and Danube rivers. The confluence area was a floodplain 500 to 700 m wide, bordered by two terraces where several settlements developed: the town of Orșova and the villages of Jupalnic and Tufări. Along the former floodplain, the Cerna River had several braided streams, sand accumulations, small islands, and marshes, typical for the natural evolution of the confluence area (Figure 3).

Figure 3: Fluvial morphology of the confluence area between the Cerna and Danube rivers in 1939, prior to the formation of the Iron Gates I reservoir. ►


Poienilor Ridge
340
295.3
Ogaşu Izneu
196.2
Bisericii Hill
185
286.8
Cioaca Mare Peak
268.6
107
Dracului Hill
Jupalnic
Orşova
70
67
61
63
Vale Slătinicului
Ozoina Ridge
263.6
163.6
Tufări
Valea lui Stan
55
70
Alion Hill
316.7
Cerna River
50
147.8
57
48
DANUBE
100
200
• 70 Altitude point (m)
Temporary stream
Fluvial harbor
Railway
Road
Country boundary
Building
River bed
Alluvium
Swamp
Outlier
Gravel
Floodplain
1st terrace
2th terrace
Altitude
353.8 m
14.3 m
N
0
500
m
Map by: Constantin Nistor
Source: Topographic maps

The current depth configuration of the Cerna Gulf is closely linked to the old micro-landforms and to the sedimentation processes. In this respect, Figure 4 illustrates the correspondence between the deepest bathymetric points and the former channel of the Cerna River. Low water depths were also found close to the left bank, where submerged stream cutting is intensive. Except for the areas of the highest micro landforms that featured the former topography of the Cerna Valley, low water depths were found at the mouth of Cerna River and in the junction area between the Cerna Gulf and the Danube River channel, caused by a large accumulation of sediments.

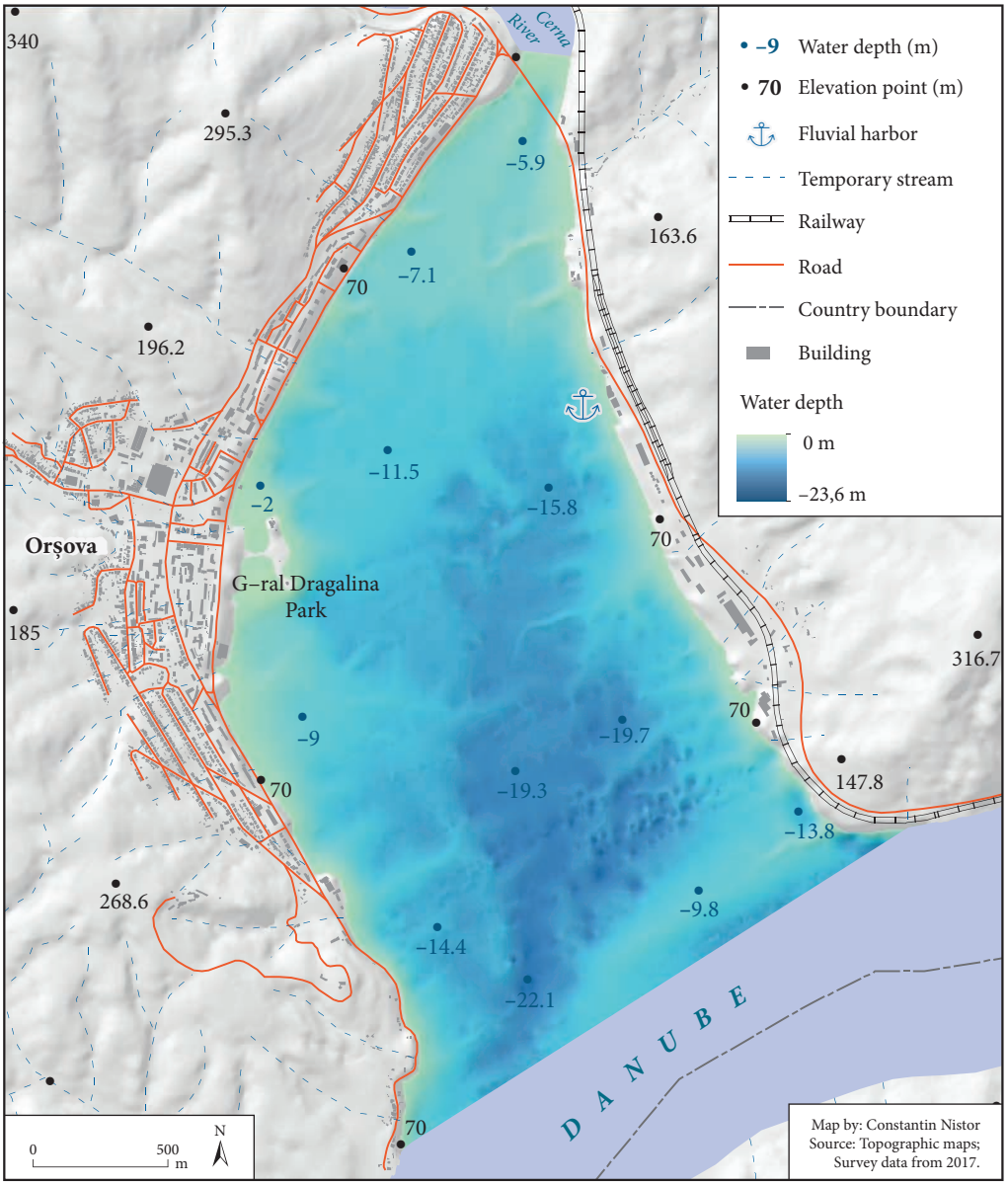


Figure 4: Current bathymetric configuration of the Cerna Gulf (2017).

The spatial distribution of topographic changes between 1939 and 2017 shows accumulation areas, marked by positive values, as well as erosion areas, marked with negative values, separated by sectors of minimal change. The analysis of the spatial distribution of the changes reveals the presence of three distinct sectors, marked on the map in Figure 5 as a, b, and c.

The first sector corresponds to the Cerna River fan deltas (Goudie 2006), at the entrance into the reservoir. This conical deposit is 1,300 m long, with a maximum width of 350 m. The granulometry classes feature 10% gravel in the upper section, 70% sand, and 20% silt in the lower part (Sârbu 2001). The bathymetric

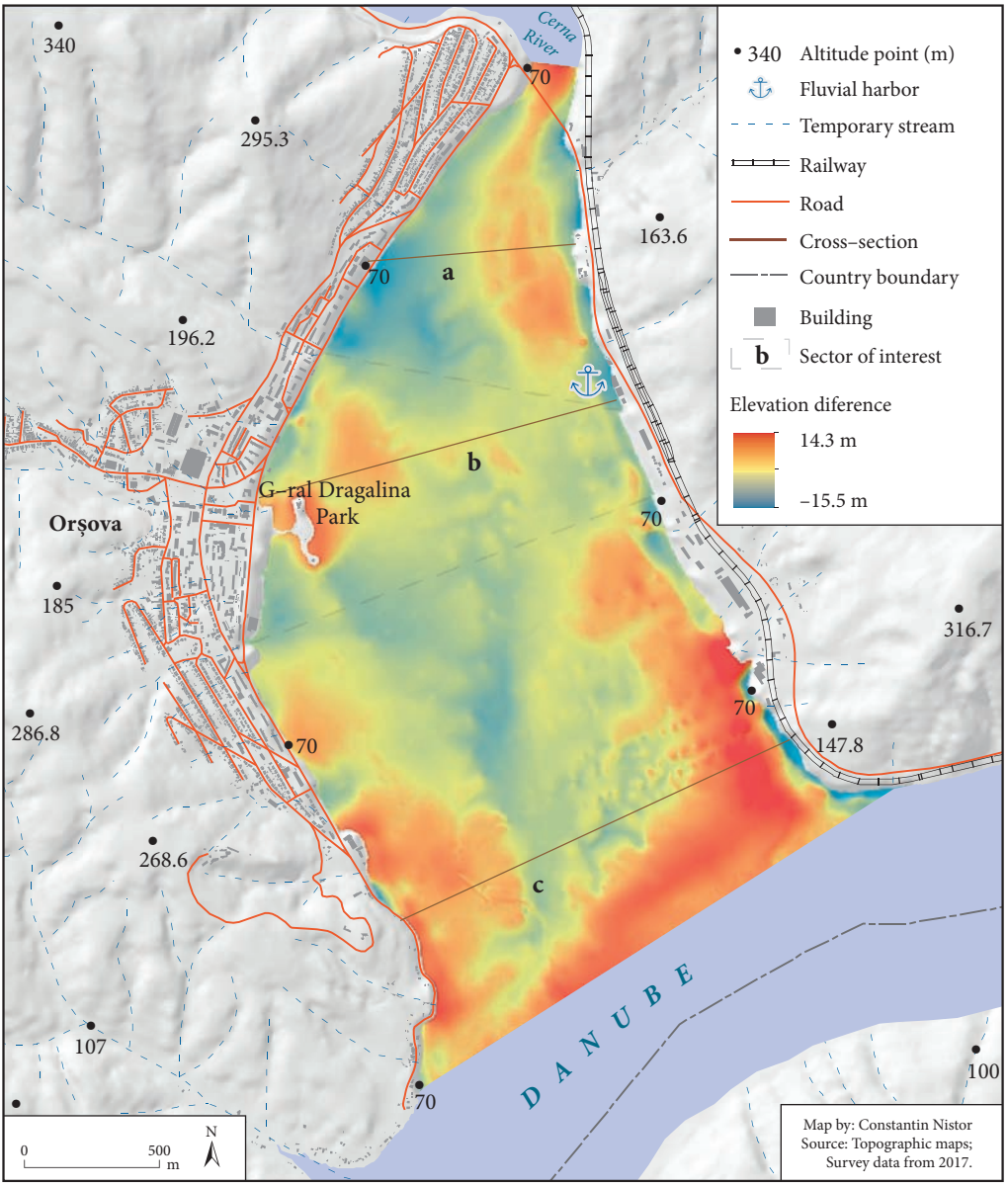


Figure 5: Map of topographic changes from 1939 to 2017 in the Cerna Gulf area.

profile crossing the first sector (Figure 6a) highlights the accumulation process in the central part with an alluvium thickness up to 5.5 m. It shows that the former channel of the Cerna River is completely covered by a sediment layer corresponding to the alluvial fan.

The second sector corresponds to the junction area of the main streams of the Cerna and Danube rivers. Sediments are distributed over a large surface due to the circular submerged stream generated by the Danube River, which crosses the former channel of the Cerna River. Anthropogenic structures, such as the General Dragalina Town Park island and the ship pontoons, influenced the configuration of the submerged landforms in this sector. Moreover, significant alluvium inflow is due to sediments carried by temporary streams to the right slope of the gulf, especially after major rainfall periods in April, May, and June.

The profile crossing the central area of the Cerna Gulf (Figure 6b) shows that the initial landforms – the extensive floodplain and the terraces of the Cerna River – were covered by sediments with a diverse and changing morphology. The accumulation process is dominant because the thickness of the sedimentary layer reaches 5 to 6 m in the western part of the profile due to lateral sediment inflow and the development of the artificial island in front of Orșova's new downtown. On the eastern edge of the gulf, which corresponds to Orșova's port area, the cross-profile indicates degradation of the topography because of excavation work along the new highway and railway embankments and cuttings (before 1970).

The third sector is influenced by the main stream of the Danube River, whose sediment supply is substantial. Within this sector, the sediments cover a compact area with a thickness up to 14 m and a maximum width over 500 m, similar to a cross-bar. The Cerna Gulf is located where the Danube River changes its flow direction from 40° NE to 80° E. This change of about 40° has significant effects on the river hydrodynamics with a higher inertia of flow. The main stream of the Danube, featuring a linear trajectory imposed by the alignment of the riverbed, tends to maintain its direction when entering the gulf area.

The profile crossing the third sector (Figure 6c) highlights the intensity of the accumulation process, mainly along with the lateral parts of the gulf. The old town of Orșova, located in the western part of the gulf, is covered with a sediment layer 5 to 6 m thick. On the opposite side, the sediment thickness reaches 12 m, but near the left shore the elevation decreased by 7 m in 2017 as an effect of anthropogenic reshaping of slopes prior to the development of the reservoir between 1965 and 1972. The central part of the gulf is affected by erosion processes.

The spatial analysis of the negative changes to the topography in the Cerna Gulf area reveals an unequal distribution that can be linked to various processes such as fluvial erosion, lacustrine abrasion, and anthropogenic processes. Many areas affected by negative changes are located near shorelines, where the elevation differences reach −15 m. These differences can be explained by the anthropogenic transformation of landforms and fluvial erosion. Engineering work such as blasting and reinforcement of slopes were required to rebuild the national/European highway from Bucharest to Timișoara and the main railway sectors 20 m higher than their original position. Other work was necessary for the construction of three road and railway viaducts crossing the main tributaries in the Cerna Gulf: the Cerna, Slătinicului, and Valea lui Stan rivers. Moreover, the port area and the dockyard site are regularly dredged in order to maintain a constant depth. Downstream from the town of Orșova, the Danube River's flow velocity generates submerged cutting of streams into the left slope, with effects on the channel and bank erosion.

The central area of the gulf is marked by negative changes of as much as −3 m, corresponding to the former channel of the Cerna River. During the periods with high flow rates, the alluvia are removed and the bottom of the gulf is eroded.

Other areas affected by negative changes are related to anthropogenic excavations such as slope tilting and to lacustrine abrasion caused by short-term variations in the water level due to reservoir management work.

4 Discussion

Under natural conditions, the beds of the Cerna and Danube rivers were paved with coarse deposits containing gravels mixed with sands known as the facies of the Danube. Measurements performed in 1968, 1973, 1975, and 1976 at km 955 on the Danube River revealed a positive balance for the former settlement site at Orșova, featuring an accumulation process with a sediment thickness between 1.0 and 2.5 m (Vespremeanu and Posea 1988).

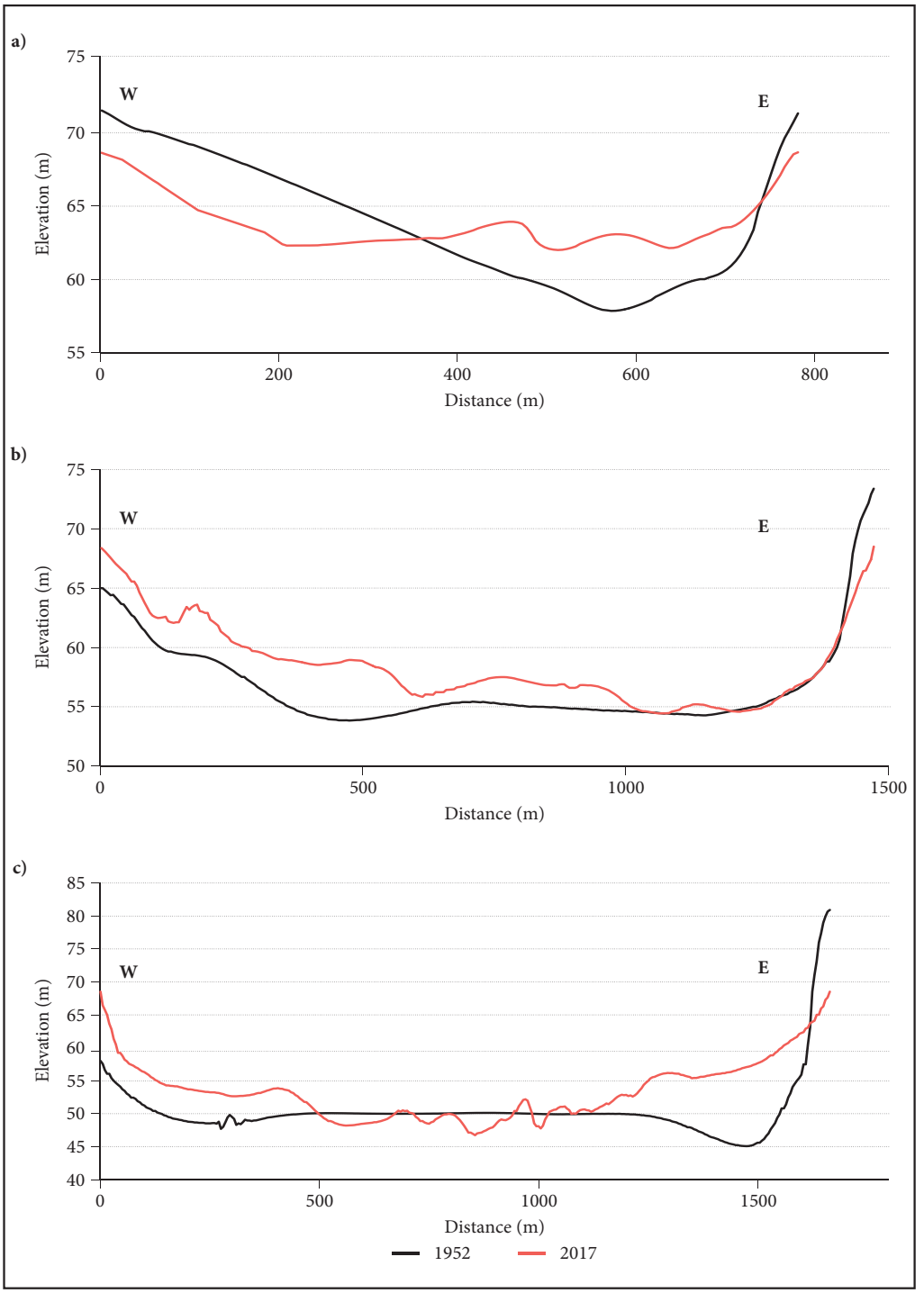


Figure 6: Cross profiles in the Cerna Gulf area, showing the topography before and after the Iron Gates I reservoir formation: a) first study sector, b) second study sector, c) third study sector.

The analysis of the spatial distribution of the sediments confirms the current siltation trend in the IG I reservoir (Diaconu 2005; Zaharia 2008; Babic Mladenovic, Kolarov and Damjanovic 2013). Our study maps for the first time the development of an alluvial bar tending to close the Cerna Gulf. Diaconu (2005) identified a similar distribution of sediments in the study area, mentioning intensive accumulation at the mouth of the Cerna River and also in the eastern part of the gulf, together with a deepening trend along the west shoreline. Șelău (2010) mentioned the development of a submerged alluvial deposit about 1 km long up to the entrance of the Cerna River into the gulf and a sediment cover more than 6.0 m deep.

For the entire gulf area, it has been clearly observed that the maximum thickness of the sediments reaches 14 m with a mean value of 3.8 m. This is related to a period of 45 years, from 1972 to 2017, at a mean rate of 8.2 cm/year. Other in situ measurement data obtained under similar environmental conditions at the confluence of the Topolnica River with the Danube on the Serbian side show a rate between 3 and 10 cm/year (Vukovic, Vukovic Stankovic 2014).

The lacustrine abrasion process is related to the water level oscillation as a main effect of reservoir management, together with the waves generated by international ship traffic of goods and passengers. Previous studies showed that the annual water level oscillations at the Orșova hydrometric station can reach 6.2 m, with a maximum rate of 1.3 m per day (Zaharia 2008). Fast and high-level variations reduce the stability of the neighboring slopes and shorelines, causing their collapse in extreme conditions. The abrasion process mainly affects the steeper shorelines, which can retreat by about 1 m/year (Zaharia 2008), contributing to the sediment supply to the reservoir.

The results were validated by measuring the sediment volumes accumulated, calculated through GIS spatial analysis. These were compared with the measured suspension sediment volumes supplied to the reservoir by the Cerna River. Sârbu (2001) estimates that the Cerna River has a suspended sediment discharge of 95,541.4 tons/year, which amounts to 1.8 million m^3 based on a sample density of 2,400 kg/m^3, according to Oaie et al. (2015), for 45 years since the IG I reservoir was formed. This value is similar to our estimate of 1.72 million m^3.

The project for electricity production in this section of the Danube Basin was extended for tributary rivers as well. In this respect, two other reservoirs, Lake Valea lui Iovan and Lake Hercule, were built upstream, along the Cerna Valley sector for power generation and flood prevention (Pop 1996). The construction of these reservoirs along the Cerna River in 1983, with a water volume of 138 million m^3, led to a decrease in the river flow rate from 35 m^3/s to 18.5 m^3/s (Sârbu 2001; Hrvatin et al. 2019). As a consequence, the stream power flowing into the Cerna Gulf significantly decreased. The alluvium did not reach the Danube River's main channel, leading to the development of the fan delta in the upper section of the Cerna Gulf.

The damming of the Danube River altered the sediment flow from 67.5 million tons/year before the reservoir formation to 30 million tons/year measured at the discharge mouths (Panin and Jipa 1998). The decrease of the sediment volume supplied by rivers into the sea is a general feature for most dammed rivers (St□nic□ and Panin 2009). For example, the sediment amounts of the Yellow River in China decreased by three times after the construction of the Sanmenxia Dam and Xiaolangdi Dam (Yonggui et al. 2013). The same situation occurred after the construction of the Aswan High Dam in 1964 on the Nile River in Egypt (Gu, Chen and Salem 2011; Kantoush and Sumi 2013). The Mississippi River in North America, one of the most modified rivers (Kesel 2003), has had a total decrease in sediment flow from 400 million tons/year to 200 million tons/year (Allison et al. 2012; Meade and Moody 2009), leading to erosion processes on 60% of the deltaic coast (Bentley et al. 2014). For the Danube, the Gabčíkovo–Nagymaros Dams led to the retention of 70% of sediments transported (Smith, Szilágyi and Horváth 2002).

5 Conclusion

This study provides the first detailed map of the submerged relief of the Cerna Gulf, which developed after the Danube River was dammed and the IG I reservoir formed. These results highlight the spatial distribution of accumulation sectors, which reach 14 m in thickness, as well as areas with negative changes in topography caused by anthropogenic work together with erosion processes.

The Cerna Gulf is a characteristic area along the Danube River where accumulation processes exceed erosional ones by a ratio of 4:1, emphasizing a smooth lake clogging tendency. Sediment deposition changed the submerged morphology during the last 45 years, leading to the accumulation of an alluvial fan at the

mouth of the Cerna River and an alluvial bar between the Cerna Gulf and the main channel of the Danube River. The siltation process has a negative effect on river transportation as well as on the sustainability of the port in Orşova, which specializes in coal and coke transport. It also has a negative impact on emerging tourism traffic and on shipyard activities, which involve the production of hulls. In addition, it decreases the volume of water storage and accelerates the eutrophication level. For this reason, periodic dredging activities are required to allow ships to access the Orşova port basin.

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SPATIAL DIVERSITY OF ECOLOGICAL STABILITY IN DIFFERENT TYPES OF SPATIAL UNITS: CASE STUDY OF POLAND

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Spring landscape of Roztocze, Poland.

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Spatial diversity of ecological stability in different types of spatial units: Case study of Poland

ABSTRACT: The study estimates and compares the spatial distribution of ecological stability within administrative units in Poland. Its method permitted the value of the coefficient of ecological importance parameter to be determined, and enabled the design of a spatial unit typology. The units originally analyzed were municipalities (Pol. *gminy*). In this variant, areas with low and average ecological stability were evidently dominant. Verifying the results obtained involved extending the study, and using of a square with sides of 1 km as the basic unit of assessment. This approach yielded dominance of areas extreme in terms of ecological stability. The spatial analyses also allowed for the spatial dependence of the phenomenon to be identified and illustrated spatially.

KEYWORDS: Coefficient of Ecological Importance, spatial autocorrelation, spatial planning, land cover, landscape, Poland

Prostorska raznolikost ekološkega ravnovesja v različnih tipih prostorskih enot: primer Poljske

POVZETEK: V raziskavi avtorici proučujeta in primerjata prostorsko porazdelitev ekološkega ravnovesja v upravnih enotah na Poljskem. Z izbrano metodologijo sta določili vrednost koeficienta ekološkega pomena in izdelali tipologijo prostorskih enot. Osnovna prostorska enota, ki sta jo najprej analizirali, je bila občina (pol. *gminy*). Rezultati so razkrili, da v njih prevladujejo območja z nizkim in povprečnim ekološkim ravnovesjem. Da bi avtorici preverili dobljene rezultate, sta raziskavo razširili in za osnovno enoto tokrat uporabili kvadrat s stranico 1 km, za katero so rezultati pokazali prevlado območij z ekstremnimi vrednostmi ekološkega ravnovesja. S prostorskimi analizami sta avtorici lahko določili tudi prostorsko odvisnost proučevanega pojava in jo prikazali v prostoru.

KLJUČNE BESEDE: koeficient ekološkega pomena, prostorska avtokorelacija, prostorsko načrtovanje, pokrovnost tal, pokrajina, Poljska

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1 Introduction

The cultural landscape is constantly evolving to meet the ever-changing needs of present and future generations. One of the main factors currently influencing significant changes in the landscape structure is human activity (Verburg et al. 1999; Verburg et al. 2002; Dotterweich 2008; Geri et al. 2010; Baran-Zgłobicka and Zgłobicki 2012; Ribeiro and Šmid Hribar 2019). New anthropogenic elements introduced into the natural environment contribute to landscape transformation. Their intensity has an impact on the ecological stability of the landscape. Considerable accumulation of such elements may lead to gradual degradation of the natural environment and disturbances in the area's ecological stability (Richling and Solon 1994; Król and Gałaś 2008).

Ecological stability is defined as the ecosystem's ability to return to equilibrium, or to its »normal« direction of development, via its own internal mechanisms. The sooner the ecosystem returns to its original balance, the more stable it is (Holling 1973; Vološčuk and Míchal 1991). Forman and Godron (1986) define landscape stability as the landscape's resistance to disturbances and its ability to regenerate after they occur. Bičik et al. (2015, 9) define it as »a condition that is inversely related to the amount of energy, material, and labor invested by the society so that the landscape remains in a balanced condition.« Over time, landscapes and ecosystems undergo natural transformations (Widacki 1979). As a result, the forms, functions, and significance of landscapes also change (Urbanc et al. 2004). Therefore, the stability of the natural environment is dynamic. Considering all of this, when a disruptive factor is introduced, the natural environment is not able to return to its exact original state, even though it can achieve an approximation of it (Balon 2006). Zaušková and Midriak (2007) also point to the dynamic ability of ecosystems to maintain and restore the conditions of their existence through self-regulatory mechanisms. This is reflected in their stability and resistance to natural and anthropogenic factors.

Two main trends are designated in landscape stability research (Balon 2006; Gigon and Grimm 2014). The first refers to natural areas capable of functioning owing to internal mechanisms, without human intervention: the »natural« approach (e.g., Gigon 1983; Geng et al. 2019). The second refers to stability assuming the presence of anthropogenic activities and economic uses of the natural environment: the »utilitarian« approach (e.g., Messerli 1983; Winiger 1983; Fuentes 1984; Zhang et al. 2017). a mixed approach also exists that combines both of these (e.g., Kienholz et al. 1984; Ganjurjav et al. 2019).

Pinpointing and evaluating the ecological stability of a landscape is a complex process, in which the level of ecological stability of a given area may reflect a coefficient of ecological importance. It can be expressed numerically, whereas the result is only an approximation of the reality behind the model (Bastian and Schreiber 1999). Mandatory large-scale landscape studies of this type have been conducted in the Czech Republic and Slovakia as part of their Territorial Systems of Ecological Stability (Moyzeová and Kenderessy 2015; Kočická et al. 2018). Meanwhile, a number of approaches to measuring ecological stability have been developed over the years, presented in works by Turner et al. (1993), Yang et al. (2016), and (Kazakov 2019), and others. Poland's attempts to estimate ecological stability levels to date have concerned the local level (the area of a municipality and the area around a water reservoir), as in Król and Gałaś (2008), Gałaś and Gałaś (2009), the regional level (Subcarpathia Province and Holy Cross Province) by Salata et al. (2016), Ciupa and Suligowski (2018), and the country level (based on land-use structure data from the Central Statistical Office for each province) by Harasim (2015). These studies appear insufficient, and do not provide necessary information on the ecological stability of Poland overall. The studies cited here primarily focus on selected areas of Poland, with analysis of various types of single spatial units, such as drainage basins, municipalities, or provinces. As a result, the results obtained are not comparable. Moreover, the local character of the research does not permit conclusions to be drawn regarding the level of ecological stability throughout the entire country. Some of them are also based only on statistical data or individually vectorized objects from base maps. Particularly in the second case, this carries the risk of generalization and subjectivity. It should be emphasized that the statistical data used in Harasim's work (2015) refer to the provincial level, and provide only a very general view of ecological stability, with no differentiation between them. The methodology adopted in this paper is the first attempt at comprehensive research on ecological stability carried out at the level of Poland's administrative units based on spatial data. This paper is an important contribution to help fill this research gap, and such an in-depth analysis of ecological stability is likely to be a useful tool for shaping the broadly defined spatial policy.

The objective of this study is to compare the spatial diversity of Polish municipalities' ecological stability and to calculate the spatial autocorrelation of this phenomenon in order to determine spatial dependencies. An additional aim is to verify the results by comparing them with those of an artificial geometric division; that is, a square with sides of 1 km.

2 Material and methods

The source material for this paper was the CORINE Land Cover (CLC) 2018 database maintained by the European Environment Agency. This database contains data on current land cover across all of European territory. The data contained in the database are hierarchically grouped at three levels. The first level consists of five main land-cover classes: anthropogenic land, agricultural land, forests and semi-natural ecosystems, wetlands, and water areas. The second and third levels provide further details within more precise categories (Heymann et al. 1994). Poland's data were provided by the Chief Inspectorate of Environmental Protection.

In our study, estimating the degree of ecological stability in administrative units employed the Bičik's (1995) method of classifying and verifying areas. For the purpose of this analysis, the typology of land-cover classes included in CLC 2018 (Table 1) was replicated to enable appropriate weights of ecological importance (*cei*), as proposed by Bičik et al. (2015), to be assigned to particular classes of land cover. This treatment allowed a classification to be obtained that can be used in similar area studies at the local, regional, national, and international scale. An additional advantage of the division proposed in this paper is the fact that the CLC database is widely available, free of charge, and identical for many European countries. It offers access to unified data, reinforcing the spatial compatibility of the dataset, and permitting comparison of different areas.

A number of methods exist for determining a site's level of ecological stability. The majority are based on assigning a numerical value to the ecological stability indicator, allowing for a qualitative assessment of the area under investigation. The most basic methods are those proposed by Míchal (1982), Löw (1984), and Miklós (1986). Míchal's method is the simplest. It pertains to the relationship between the surface area of areas defined as stable (e.g., forests, waters, meadows, and pastures) and the surface area of unstable areas (e.g., arable and built-up land). This approach was modified by Löw to assign individual landscape elements to five degrees of stability that were given constants reflecting their importance. The process developed by Miklós does not divide landscape elements into stable and unstable ones, but introduces numerical coefficients that differentiate their ecological stability. This method reflects the ecological stability of the spatial composition of the area studied by determining the relation between the sum of products of areas occupied by individual landscape elements and their corresponding weights of ecological stability to the total area of the terrain in question. This approach was the starting point for Bičik et al. (2015) in their procedure for assessing complex ecological stability used in this paper. In line with the adopted methodology (Bičik et al. 2015), the Coefficient of Ecological Importance (CEI) was used to estimate the degree of ecological stability. It is the sum of the products of the appropriate weights of ecological stability and the percentage of the area of each basic unit of assessment (BUA) that is covered by the classes of the features mentioned above. Graphically, it represents a projection of the degree of ecological stability of these BUAs. The CEI for an individual spatial unit is expressed as the following formula (Bičik et al., 2015):

$$CEI_i = \sum_{(c=1)}^{n} cei_c \cdot P_{ci} \quad (1)$$

where: CEI_i = coefficient of ecological importance in BUA_i, cei_c = weight of ecological importance of land-cover class c, P_{ci} = percentage of the area of the BUA_i covered by land-cover class c, n = number of land-cover classes, and i = individual BUA.

The values of individual weights of ecological importance (*cei*) reflect the ecological stability of individual landscape elements, and fall within a range of 0 to 1, where the value »0« represents anthropogenic areas (heavily transformed by human activity), and »1« represents valuable natural areas (scarcely transformed by human activity). Similarly, values of the synthetic coefficient of ecological importance (CEI) are in a range from 0 to 1, with the value »0« standing for ecologically insignificant areas, and »1« ecologically significant areas. The level of ecological stability of a study area increased with an increase in the

Table 1: Reclassification of CORINE Land Cover 2018 land-cover classes with assigned *cei* weights.

Land-cover class	Level I CLC	Level II CLC	Level III CLC	CLC Code	*cei* weight
1. Forest and semi-natural areas	Forest and semi-natural areas	Forest	Broad-leaved forest	311	1.00
			Coniferous forest	312	
			Mixed forest	313	
		Scrub and/or herbaceous vegetation associations	Natural grassland	321	
			Moors and heathland	322	
			Sclerophyllous vegetation*	323	
			Transitional woodland/shrub	324	
		Open spaces with little or no vegetation	Beaches, dunes, sands	331	
			Bare rock	332	
			Sparsely vegetated areas	333	
			Burnt areas	334	
			Glaciers and perpetual snow*	335	
2. Wetlands and water areas	Wetlands	Inland wetlands	Inland marshes	411	0.79
			Peat bogs	412	
		Coastal wetlands*	Salt marshes*	421	
			Salines*	422	
			Intertidal flats*	423	
	Water bodies	Inland waters	Water courses	511	
			Water bodies	512	
		Marine waters	Coastal lagoons	521	
			Estuaries*	522	
			Sea and ocean	523	
3. Permanent grasslands	Agricultural areas	Pastures	Pastures	231	0.64
4. Permanent crops	Agricultural areas	Permanent crops	Vineyards*	221	0.34
			Fruit trees and berry plantations	222	
			Olive groves*	223	
5. Other agricultural areas	Agricultural areas	Arable land	Non-irrigated arable land	211	0.14
			Permanently irrigated land*	212	
			Rice fields*	213	
		Heterogeneous agricultural areas	Annual crops associated with permanent crops*	241	
			Complex cultivation patterns	242	
			Land principally occupied by agriculture, with significant areas of natural vegetation	243	
			Agro-forestry areas*	244	
6. Other areas	Artificial surfaces	Mine, dump and construction sites	Mineral extraction sites	131	0.14
			Dump sites	132	
			Construction sites	133	
		Artificial, non-agricultural vegetated areas	Green urban areas	141	
			Sport and leisure facilities	142	
7. Built-up areas	Artificial surfaces	Urban fabric	Continuous urban fabric	111	0.00
			Discontinuous urban fabric	112	
		Industrial, commercial and transport units	Industrial or commercial units	121	
			Road and rail networks and associated land	122	
			Port areas	123	
			Airports	124	

* Classes that do not occur in Poland. They are included in the table to ensure comparability with other potential studies in other EU countries.

index value. It is worth emphasizing that within the same methodology involved in the approach – the concept of planning used to optimize spatial organization, protection, and utilization of the landscape, called Landscape Ecological Planning (LANDEP; Miklós et al. 2019) – some authors use different ranges for the degree of ecological stability values (e.g., Reháčková and Pauditšová 2007; Igondova et al. 2016; Miklós and Špinerová 2019).

Two variants were used to estimate the degree of ecological stability. The first one used *gminy* – administrative units that roughly correspond to municipalities – as the basic unit of assessment. The average area of a municipality was 126 km². The main advantage of using this type of unit is that the message of the results is clear, and data for comparisons are commonly available from various offices and agencies. Unfortunately, a very serious disadvantage of accepting administrative units as BUAs is their internal heterogeneity that does not fully reflect the spatial distribution of the phenomenon surveyed. The heterogeneity of the area makes it difficult to compare individual units' results (Balon and Krąż 2013). In order to verify and improve the precision and level of detail of the results in this paper, a second variant was used, based on an artificial geometric division of the area studied, wherein a square with sides of 1 km was adopted as the BUA. The consistency in the area of each field – in this case 1 km² – facilitates statistical calculations, making individual results easily comparable with one another. Moreover, a BUA with a smaller area presents differences in the spatial distribution of ecological stability better and more precisely.

Regardless of the variant adopted, the procedure for estimating ecological stability was conducted in the same way. CLC 2018 land-cover classes were trimmed to the borders of the BUA. Then, each newly created parcel within a given BUA was assigned an appropriate weight (*cei*, according to land-cover class), and its share in the total area of the BUA (*P*) was calculated. Based on the above, the municipalities were ordered based on the numerical value of their ecological stability coefficient. The calculated values permitted spatial units to be classified into five equal classes corresponding to different degrees of ecological stability. Because the method used in this paper does not have fixed threshold values for individual classes, the classification proposed by Petrovič (2005) and used in works such as Mederly et al. (2006), Boltiziar and Olah (2009), Salata et al. (2016), and Krivosudský (2012) was applied. The following classes were distinguished: A: very low ecological stability (CEI 0.00–0.20); B: low ecological stability (CEI 0.20–0.40); C: average ecological stability (CEI 0.40–0.60); D: high ecological stability (CEI 0.60–0.80); E: very high ecological stability (CEI 0.80–1.00).

Determination the spatial dependence of the phenomenon studied involved performing an analysis of spatial autocorrelation. Spatial autocorrelation permits estimation of the relationship between the value of the examined variable in a given location and the value of this variable in another location. Spatial autocorrelation is referred to when a given phenomenon occurring in a particular location increases or decreases the probability of its occurrence in the neighborhood (Bivand 1980). This paper employs the global Moran's I index, one of the best-known autocorrelation coefficients. It is expressed by the following formula (Moran 1950):

$$I = \frac{n}{S_0} \frac{\sum_{i=1}^{n} \sum_{j=1}^{n} w_{i,j} z_i z_j}{\sum_{i=1}^{n} z_i^2} \tag{2}$$

where: z_i = deviation of an attribute for feature (BUA) i from its mean $(x_i - \hat{X})$, z_j = deviation of an attribute for feature j from its mean $(x_j - \hat{X})$, $w_{i,j}$ = spatial weight between feature i and j, n = total number of features, S_0 = aggregate of spatial weights.

The Global Moran's I index permits detection of the strength and character of spatial dependence in the area studied. The statistical value is in a range from −1 to 1, where negative values indicate occurrence of different values of observations in the neighborhood, 0 indicates randomness of the distribution of observation values (lack of autocorrelation), and positive values indicate similarity of values located in the neighborhood (Janc 2006).

Moreover, the Local Indicator of Spatial Association (LISA) is used to identify systems occurring in space. It allows for estimation of the degree of similarity of individuals to their neighbors, and determination of the statistical significance of these relationships (Anselin 1995). As a result, each spatial unit was classified as a high-value unit with neighbors of similar value (High-High Cluster), a low-value unit with neighbors of similar value (Low-Low Cluster), a high-value unit with low-value neighbors (High-Low Outlier), a low-value unit with high-value neighbors (Low-High Outlier), or a unit without significant statistical local autocorrelation (Janc 2006). In this paper, a local version of Moran's I statistics (LISA) was used.

Global and local Moran's I statistics were determined in ArcGIS based on Spatial Statistics Tools.

3 Research area

The preliminary research permitted the determination and presentation of the spatial distribution of seven main classes of land cover (Figure 1), as well as calculation of their share in the total area of Poland (Table 2).

Table 2: Share of land-cover classes as a percentage of Poland's surface area.

Legend	Land-cover class	Share (%)
1	Forest and semi-natural areas	33.0
2	Wetlands and water areas	2.1
3	Permanent grasslands	9.0
4	Permanent crops	0.6
5	Other agricultural areas	49.2
6	Other areas	0.5
7	Built-up areas	5.6

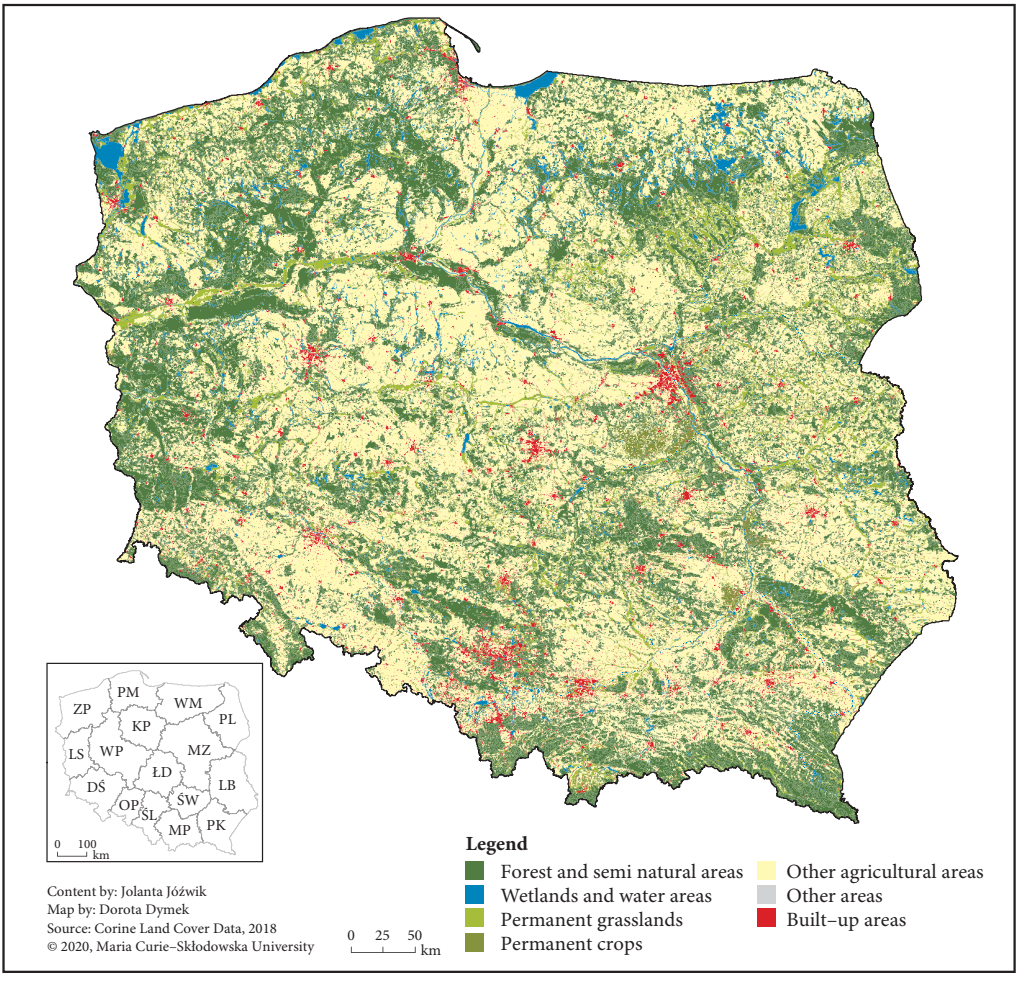

Figure 1: Spatial distribution of the land-cover classes identified. DŚ – Lower Silesia, KP – Kuyavia-Pomerania, LB – Lublin, LS – Lubusz, ŁD – Łódź, MP – Lesser Poland, MZ – Masovia, OP – Opole, PK – Subcarpathia, PL – Podlasie, PM – Pomerania, ŚL – Silesia, ŚW – Holy Cross, WM – Warmia-Masuria, WP – Greater Poland, ZP – West Pomerania.

Over 80% of the country's area is covered by two of the seven classes: other agricultural areas and forest and semi-natural areas; almost half of the country is covered by the former. The highest concentration of these areas occurs in a belt stretching from the north through the central part of the country towards the southwest. Other types of land cover form mosaic systems. The second most dominant class is forest and semi-natural areas, which occupy more than 30% of the area analyzed. They occur in a plane system, particularly in the northwestern and southern part of the country, and in a mosaic system in variable proportions over the remaining area. The remaining classes of land cover occupy a much smaller area, and together account for less than 20% of the country's terrain. Permanent grasslands, primarily located along river valleys and in northeastern Poland, dominate among these classes. a small percentage of the country's area is occupied by wetlands and water areas, as well as built-up (developed) areas. The first two are mainly located in the north of the country. Built-up areas correspond to the settlement network of the country. Larger concentrations of built-up areas occur in administrative capitals and larger cities. Permanent crops occupy the lowest percentage of the area analyzed. They are concentrated in three main basins located in central and eastern Poland, where fruit crops are grown.

4 Results

A detailed analysis of the land-cover classes identified was used to estimate the degree of ecological stability in municipalities. Further in the study, the percentage of areas occupied by individual groups in regional terms and their spatial distribution were analyzed (Figures 2 and 3).

Group a includes heavily urbanized municipalities. The landscape of these areas is not stable or consistent. The municipalities are dispersed, occupying a relatively small percentage of the country's area (4.7%). They only merge into small clusters in several places in Poland.

More than one-third of the country's area (35.7%) is occupied by areas of low ecological stability (group B), forming relatively extensive patches scattered throughout Poland.

Group C occupies the largest area in the country (37.9%). Municipalities belonging to this type form relatively large clusters cutting across areas that primarily belong to group B. In total, groups B and C occupy nearly three-quarters of the area of Poland. These groups also dominate in almost all provinces.

Areas of high ecological stability (group D) cover almost one-fifth of the country's area (18.6%). They are most highly concentrated in northern and western Poland. Small concentrations are also found in the southern and southeastern parts of the country.

Group E occupies the smallest area (only 3.1% of Poland's total area). This type emerges in ecologically stable areas with significant natural functions and little transformation by human activity. Municipalities included in group E are characterized by a high degree of spatial dispersion. They only form a band-shaped cluster along the southeastern border of the country. In the central part of Poland there are hardly any such areas.

The Lubusz Province (LS) compares most favorably to the other provinces. No municipalities classified as group a were recorded there, and more than half of the province's area (70.4%) belongs to groups D and E. The most unfavorable situation occurs in the Łódź (ŁD) and Kuyavia-Pomerania (KP) Provinces. More than half of their area is occupied by groups a and B.

Visual evaluation of the obtained results suggests the occurrence of spatial autocorrelation. To confirm this assumption, global Moran's I statistics were used. The calculations employed the spatial weighting matrix resulting from linear standardization of the neighborhood matrix, where a common boundary expressed by linear or point contact was used as a criterion of neighborhood. The statistic value obtained is 0.542 (significantly different from 0). The positive sign means that the analyzed case shows a tendency to concentrate units with similar CEI value in the neighborhood. Moreover, given the z-score of more than 2.58 and p-value < 0.001, the likelihood that this clustered pattern could be the result of random chance is less than 1%. The high values of global Moran's I statistics are confirmed by the image obtained from the Local Indicators of Spatial Association (LISA) analysis. This analysis allowed to confirm the assumption of the occurrence of cluster systems in the spatial distribution structure of the CEI (Figure 4).

In the second variant, the percentage of areas corresponding to particular classes of ecological stability changed quite significantly (Figures 5 and 6). Among all the distinguished classes, areas included in group a constitute by far the largest surface area of the country (41.0%). a similar dynamic is observed at the sub-

national (provincial) level. Almost all of the provinces are dominated by this class, and in several cases these areas occupy up to half of their area. The highest concentration of these areas occurs in central and western Poland, and in a belt stretching from the southwest to the southeast. Areas belonging to group B occupy a relatively small area of Poland (12.9%). They are characterized by a mosaic system and significant dispersion throughout the country. They are primarily located in the vicinity of areas classified under group A. Greater concentrations of these (B group) areas occur in the Masovia (MZ), Łódź (ŁD), Holy Cross (ŚW), Lublin (LB), and Podlasie (PL) Provinces. Group C shows similar dynamics. These areas occupy the smallest area in the country (10.2%), and are characterized by significant, but uniform dispersion. Areas included in group C do not merge into larger clusters. The situation is slightly different for areas with high ecological stability (group D). These areas are considerably scattered throughout the country, and occupy a similar percentage of the area as groups B and C (11.1%). They merge and form several larger clusters, particularly in the northern part of the country. The differences in the share of groups B, C, and D across all provinces are not significant, and remain at a similar level. The second largest group in

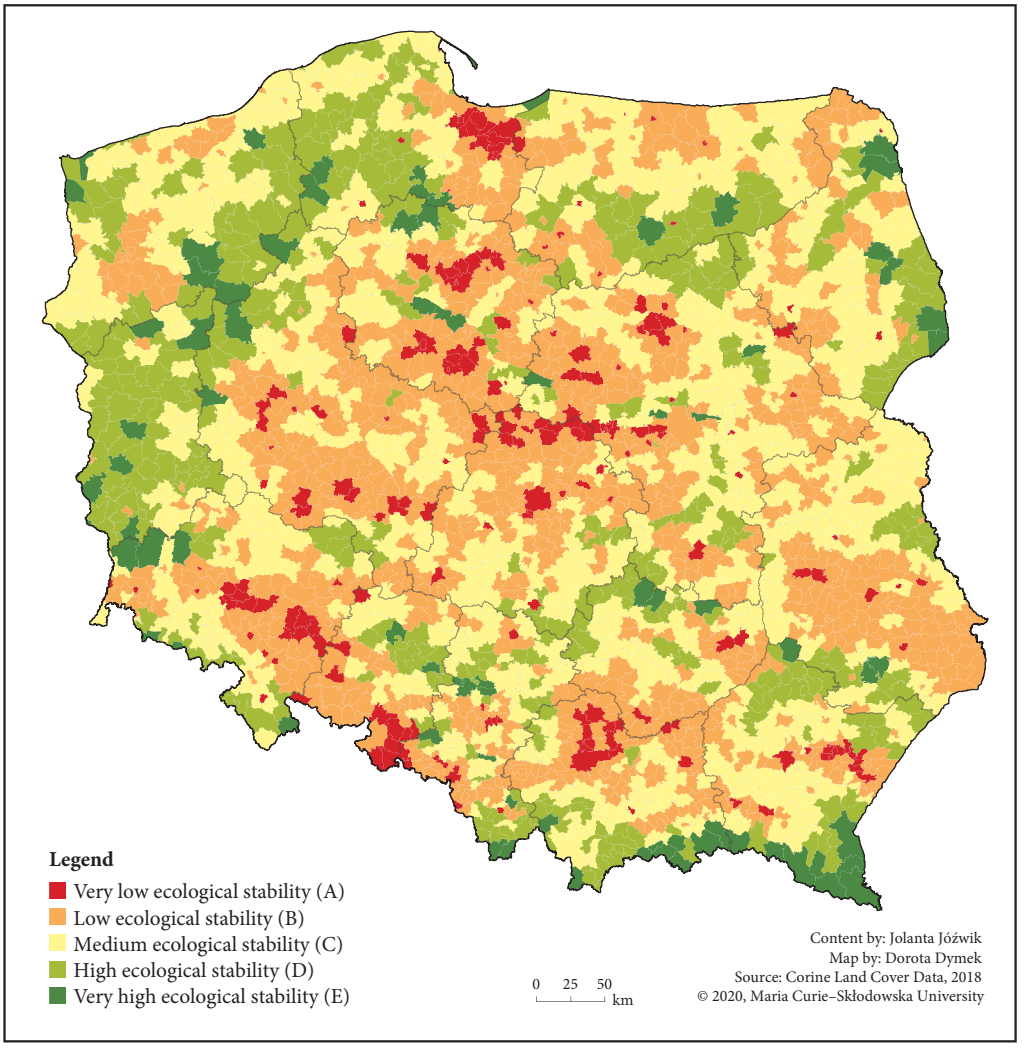

Figure 2: Spatial distribution of Poland's ecological stability classes based on the CEI value (BUA: municipalities).

terms of surface area is group E (24.9%). The spatial distribution of this group is fairly diversified. Areas of this type occur in both mosaic and plane systems. The highest concentration of these areas is located in the northern, western, and southern parts of Poland.

Like in the first variant, the most favorable situation in terms of ecological stability occurred in the Lubusz Province (LS), where groups D and E cover over 50.0% of the area. The worst situation occurred in the Łódź (ŁD) and Kuyavia-Pomerania (KP) Provinces, where groups a and B cover more than 60.0%. In this variant, the latter also included the Opole (OP) and Greater Poland (WP) Provinces.

Like in the case of municipalities, the global Moran's I statistics indicated the occurrence of spatial autocorrelation. The statistics value obtained was 0.716, suggesting a tendency to group units with similar CEI values. Given the z-score of more than 2.58 and p-value < 0.001, also in this case the likelihood that this clustered pattern could be the result of random chance is less than 1%. LISA analysis confirmed the occurrence of clusters in the area analyzed (Figure 7).

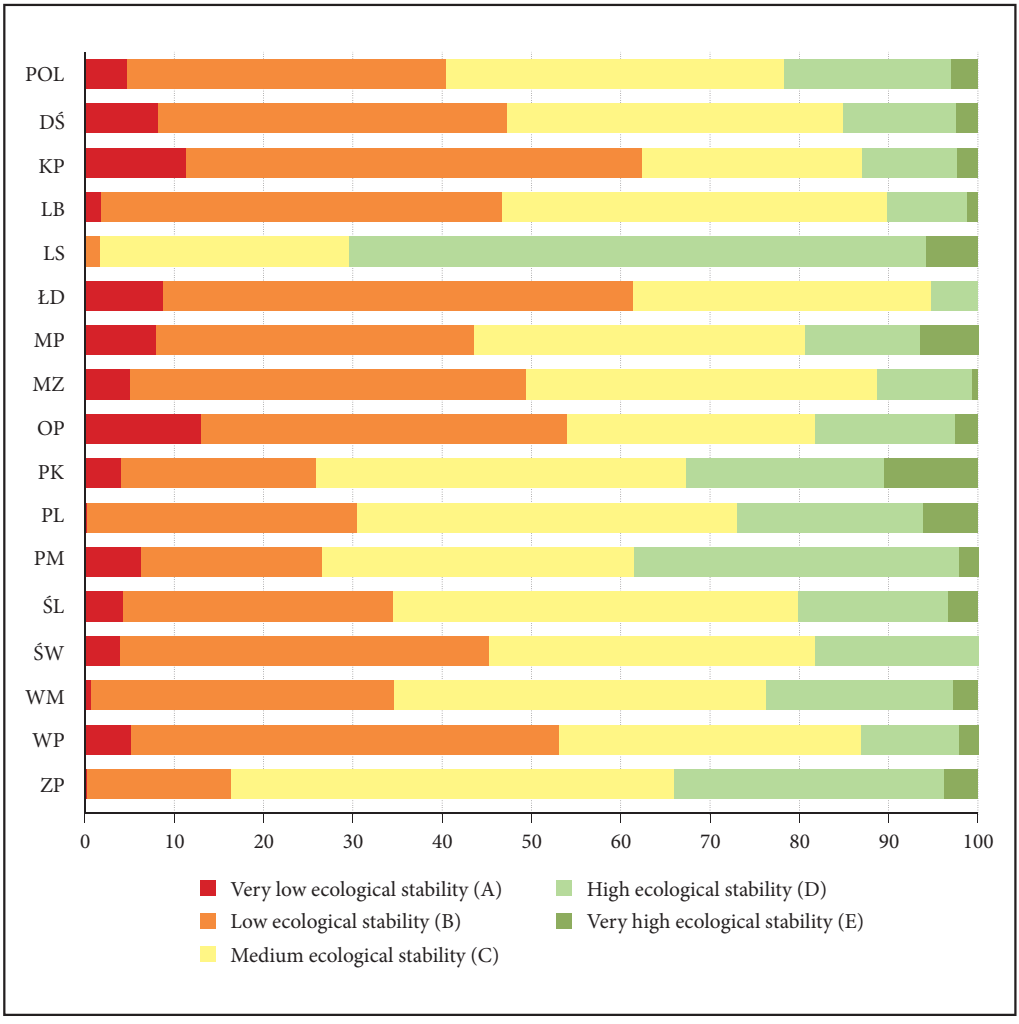

Figure 3: Share (%) of ecological stability classes at the national and provincial level (BUA: municipalities). POL – Poland, DŚ – Lower Silesia, KP – Kuyavia-Pomerania, LB – Lublin, LS – Lubusz, ŁD – Łódź, MP – Lesser Poland, MZ – Masovia, OP – Opole, PK – Subcarpathia, PL – Podlasie, PM – Pomerania, ŚL – Silesia, ŚW – Holy Cross, WM – Warmia-Masuria, WP – Greater Poland, ZP – West Pomerania.

5 Discussion

This study estimates the degree of ecological stability at the level of administrative units in Poland. The assessment was performed in two variants. The units originally analyzed were municipalities (Pol. *gminy*). The verification of the results obtained involved extending the study. a square with sides of 1 km was used as the basic unit of assessment. The spatial analyses conducted also permitted the spatial dependence of the phenomenon to be identified and spatially illustrated.

This research is an important contribution to Polish research on ecological stability. Owing to the use of the CLC 2018 unified database, the method is characterized by a relatively high level of detail and high degree of objectivity. The basic unit of assessment applied (an artificial geometric division: a square with sides of 1 km) permitted comparison of units with each other, which until now was not possible due to different types of spatial units used by other authors. Moreover, the analysis was carried out for the entire

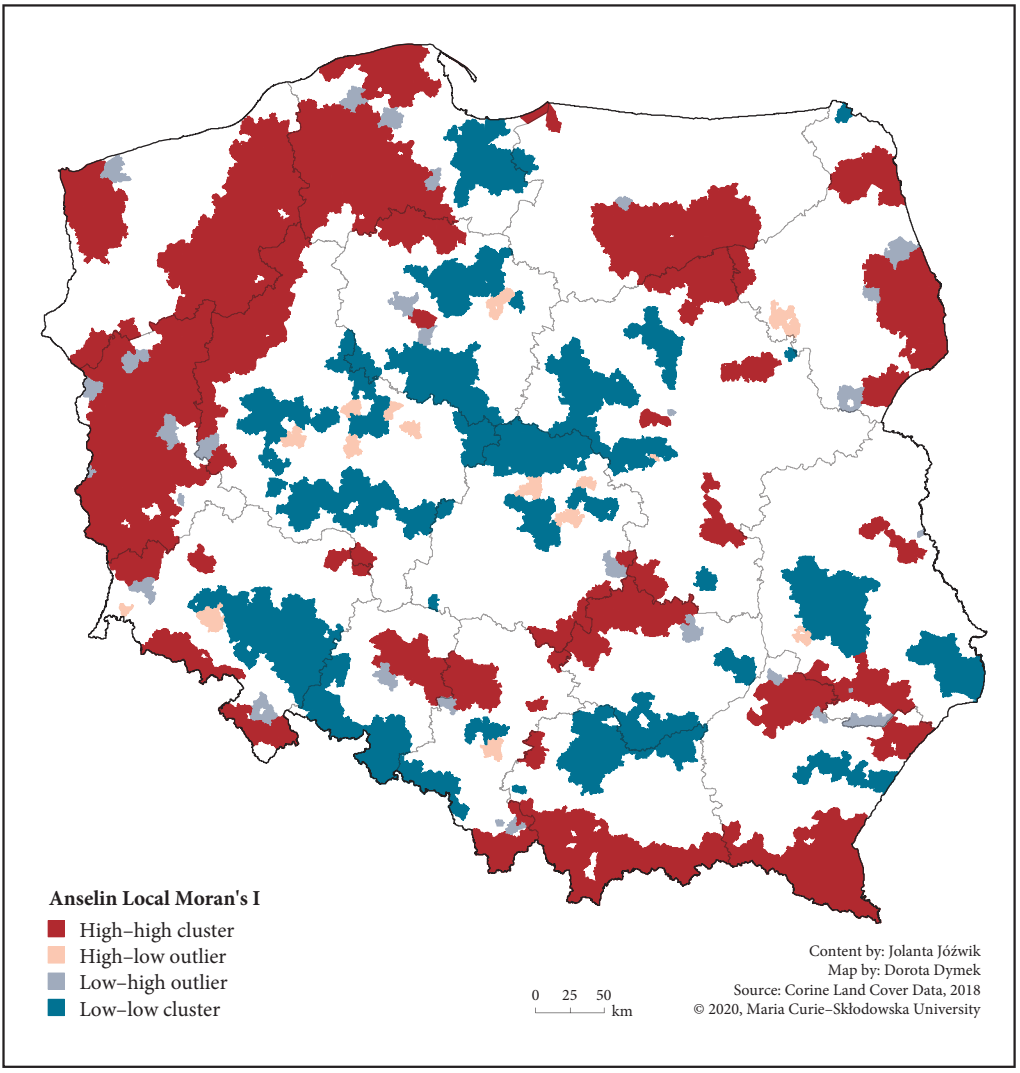

Figure 4: Distribution of cluster and outlier analysis (Anselin Local Moran's I) for CEI in Poland (BUA: municipalities).

territory of Poland, allowing for some conclusions regarding Poland's ecological stability to be drawn. The added value of the study is the extension of the statistical analysis to include a spatial analysis which, by demonstrating the spatial dependence of the ecological stability of the landscape, confirmed the occurrence of spatial units with similar values in close neighborhoods (clusters).

Adopting Poland's principal administrative units (municipalities) as BUAs revealed a clear dominance of areas concentrated around low and medium ecological stability (groups B and C). Using the second variant (artificial geometric divisions) showed the predominance of groups with extreme CEI values (group a and group E) which constituted a small percentage of the total in the first approach. Regardless of the variant applied, the most favorable situation in terms of ecological stability was observed in the following provinces: Lubusz (LS), Subcarpathia (PK), and West Pomerania (ZP). Moreover, in the case of the Subcarpathia Province (PK), the result is similar to the results of research for this area presented in 2016 by Salata et al., where a different database was used, one that is slightly more accurate than that used in

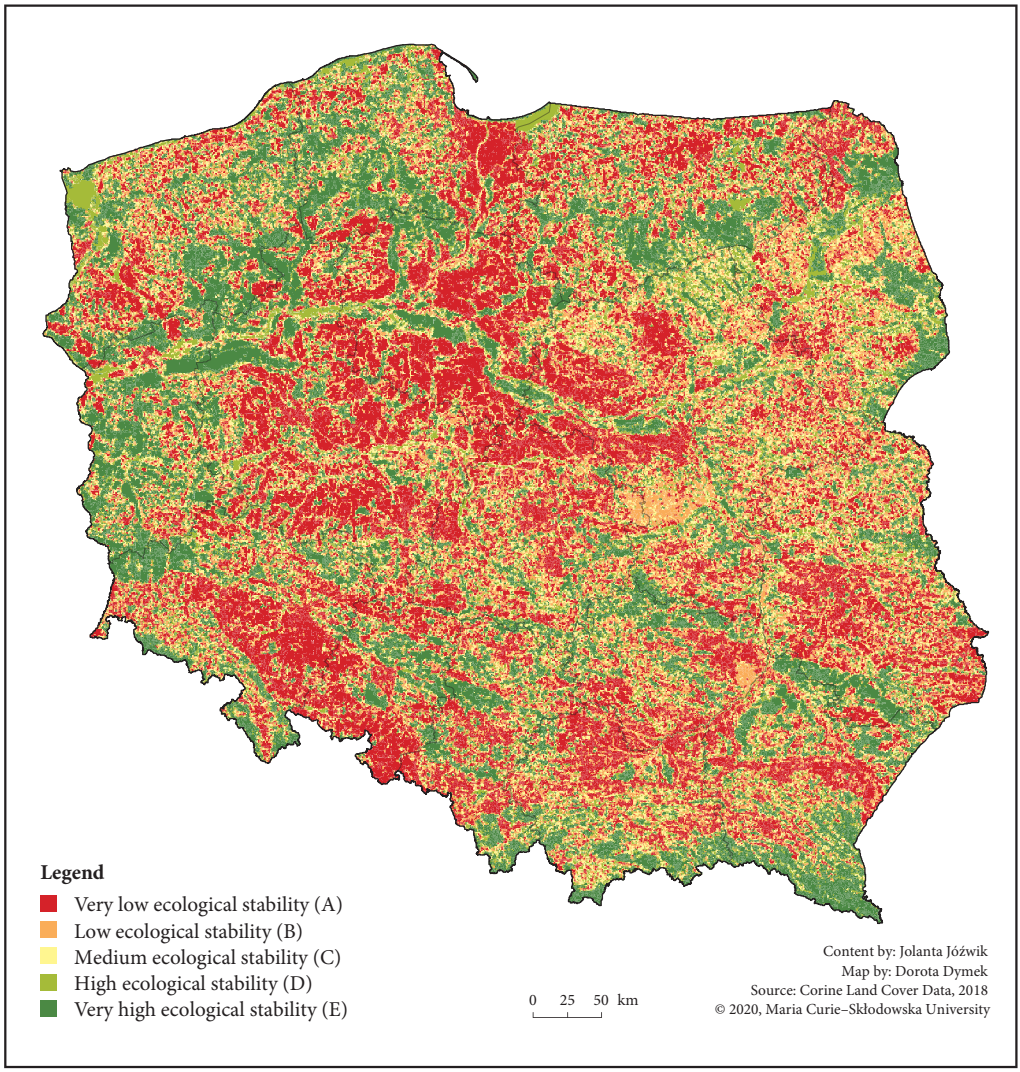

Figure 5: Spatial distribution of Poland's ecological stability classes based on CEI value (BUA: a square with sides of 1 km).

this work. This proves that the method described here can be a useful tool for comparisons between other European Union countries based on a database made according to uniform principles: the CLC database.

The heterogeneity of the results derives from the type and size of the basic units of assessment that were used. As expected, the larger the BUA, the less accurate the obtained results. Both variants have their advantages and disadvantages. The first approach reflects the general character of the municipalities fairly well, and provides a relatively easy and clear message for non-specialists, especially decision-makers at various administrative levels. The second variant is much more precise, and reflects the actual state of the analyzed areas more accurately, while the equal area of each BUA facilitates comparison of results (Balon and Krąż 2013). This approach may facilitate the identification of sensitive areas where fluctuations in the level of ecological stability are likely to occur. It should be emphasized, however, that according to the logic of ecological fallacy, it is not appropriate to transfer conclusions for the examined elements to every single unit of area that makes up that element.

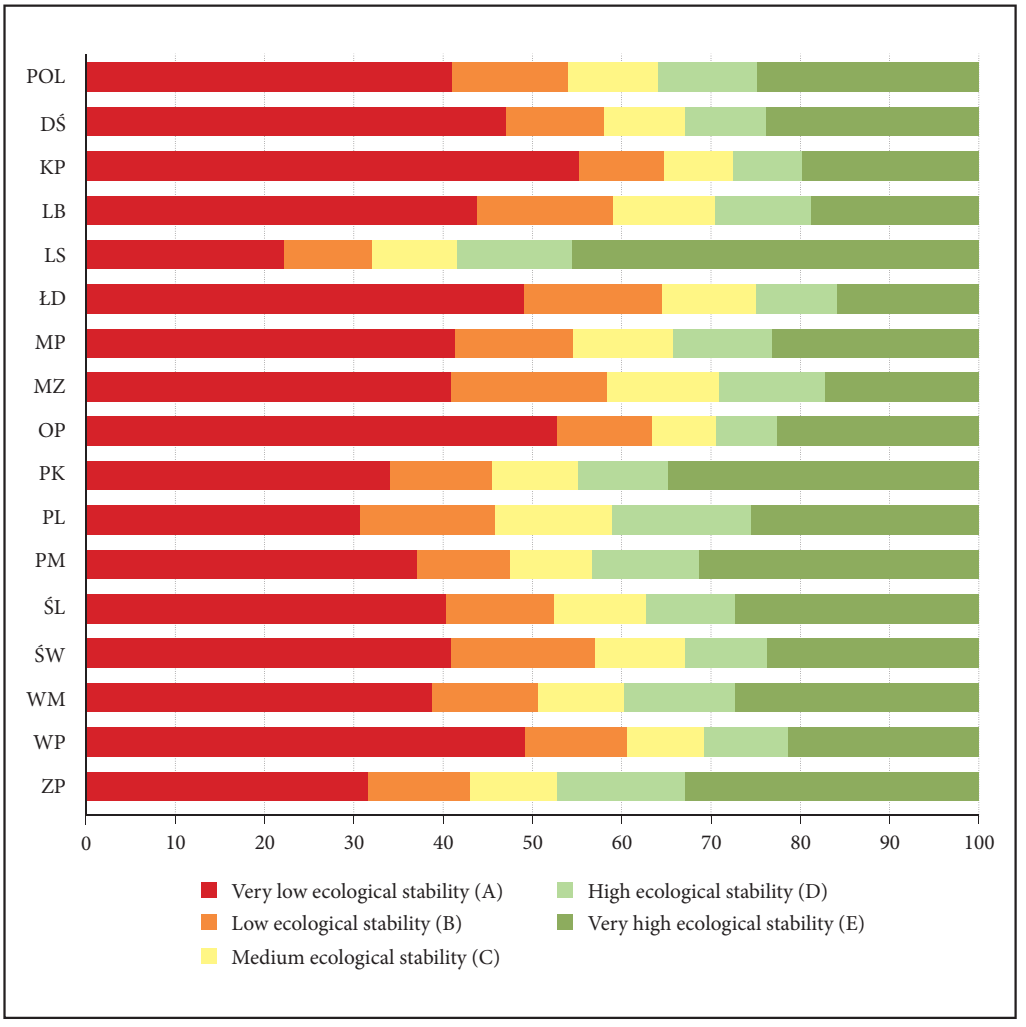

Figure 6: Share (%) of ecological stability classes at the national and provincial level (BUA: a square with sides of 1 km). POL – Poland, DŚ – Lower Silesia, KP – Kuyavia-Pomerania, LB – Lublin, LS – Lubusz, ŁD – Łódź, MP – Lesser Poland, MZ – Masovia, OP – Opole, PK – Subcarpathia, PL – Podlasie, PM – Pomerania, ŚL – Silesia, ŚW – Holy Cross, WM – Warmia-Masuria, WP – Greater Poland, ZP – West Pomerania.

The cartographic presentation of the studied phenomenon made it possible to distinguish two main systems of spatial distribution of ecological stability values, namely the plane system and the mosaic system. From the ecological point of view, the plane system is more advantageous to the extent that it is configured as a compact complex of areas that are easier to manage. The mosaic system is unfavorable, due to its significant dispersion and high internal heterogeneity of individual areas. These systems are characterized by relatively high volatility; that is, the susceptibility to transitioning rapidly to extreme states (Balon 2004; Gałaś and Gałaś 2009). Therefore, areas with mosaic systems should be given special attention to avoid further deterioration of their ecological stability.

In the case of environmentally valuable areas, it is not desirable to have low or very low values of the ecological stability index in the neighborhood. It may lead to the weakening of their potential. High fragmentation and dispersion of areas included in group E make it significantly more difficult – and, in extreme cases, impossible – to ensure that they remain undegraded. It is very difficult to take effective protective

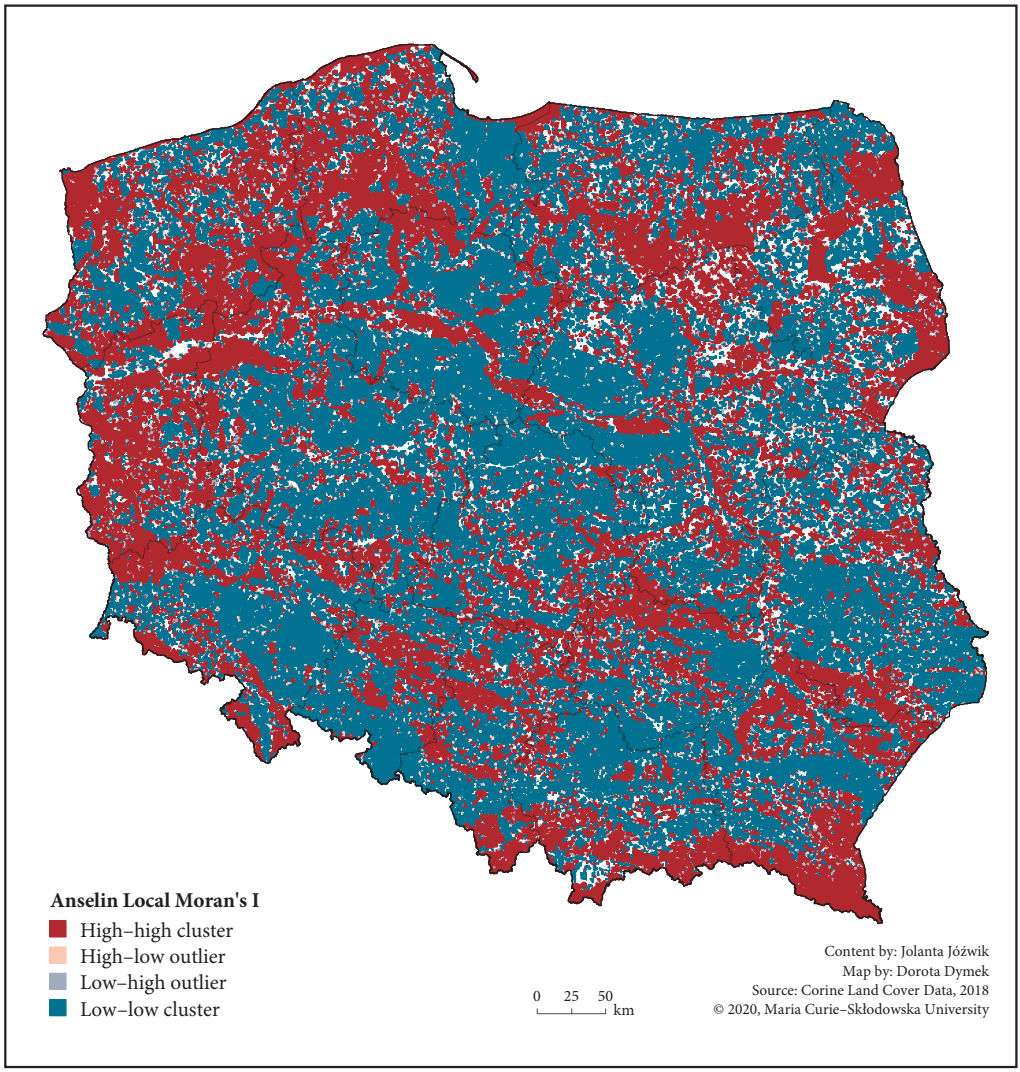

Figure 7: Distribution of cluster and outlier analysis (Anselin Local Moran's I) for CEI in Poland (BUA: a square with sides of 1 km).

measures in such areas. Moreover, the risk of irrational economic management in these areas is high, which in turn may contribute to harmful changes in the way they are administered, and in extreme cases to a complete loss of ecological potential. Such areas require both specialized knowledge and well-thought-out actions. On the other hand, mosaic systems can contribute to a sustainable flow of ecosystem services, enrich the landscape structure, and enhance the landscape's aesthetic values (Waldhardt et al. 2004), prevent soil erosion (Boardman and Poesen 2006), and significantly reduce spatial tensions and conflicts between stakeholders.

Research on the degree of ecological stability of a given area can be very useful for the implementation of beneficial land cover or changes in land use. Area analyses of this type can be applied in practice both at the initial and final stages of spatial development planning (as an important element of environmental management), in addition to being helpful in the preparation of landscape audits. They may be used to identify resources and evaluate their potential for further use.

6 Conclusions

The objective of this study was to compare the spatial diversity of administrative units' ecological stability, and to calculate the spatial autocorrelation of the phenomenon studied in order to study spatial dependencies. An additional goal was to verify the results obtained by comparing them with an artificial geometric division; that is, squares with sides of 1 km. The methods applied were sufficient for achieving the research objective. The results' degree of detail mainly depends on the spatial unit used. Analyses of this type based on a geographical information system can be easily modified and adjusted depending on the purpose and area of analysis. Moreover, the applied method confirms that the CLC database can be successfully used to determine a site's degree of ecological stability. It also permits continuous monitoring of changes in land cover or land-use structure, and can be a useful tool that supports sustainable development policies.

The research showed that the use of different types of spatial units – administrative units (municipalities), and artificial geometric divisions (squares with sides of 1 km) – significantly affects the results: the larger the basic unit of assessment, the less accurate the results obtained. In the first variant (BUA: municipalities), areas with low and average ecological stability were clearly dominant. It can be concluded that the ecological stability of Poland was close to the average level. The second approach (BUA: a square with sides of 1 km) yielded dominance of extreme areas in terms of ecological stability. Regardless of the adopted variant, the most advantageous situation regarding ecological stability was determined in the Lubusz Province, and the most unfavorable in the Łódź and Kuyavia-Pomerania Provinces. In both cases, the results of the global Moran's I and LISA analysis confirmed and illustrated the occurrence of spatial dependencies of the phenomenon studied.

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A SPATIAL DECISION SUPPORT SYSTEM FOR TRAFFIC ACCIDENT PREVENTION IN DIFFERENT WEATHER CONDITIONS

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The application SLOCrashInfo in active mode.

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A spatial decision support system for traffic accident prevention in different weather conditions

ABSTRACT: Natural conditions play an important role as determinants and cocreators of the spatiotemporal road traffic accident Hot Spot footprint; however, none of the modern commercial, or open-source, navigation systems currently provides it for the driver. Our findings, based on a spatiotemporal database recording 11 years of traffic accidents in Slovenia, proved that different weather conditions yield distinct spatial patterns of dangerous road segments. All potentially dangerous road segments were identified and incorporated into a mobile spatial decision support system (SLOCrashInfo), which raises awareness among drivers who are entering or leaving the predefined danger zones on the street network. It is expected that such systems could potentially increase road traffic safety in the future.

KEY WORDS: GIS, mobile application, spatial databases, spatial patterns, traffic safety

Prostorski sistem za podporo odločanju pri preprečevanje prometnih nesreč v različnih vremenskih razmerah

POVZETEK: Vremenske razmere so pomemben dejavnik in soustvarjalec prostorsko-časovnih vzorcev prometnih nesreč. Kljub veliki uporabni vrednosti podatki o prostorskem odtisu prometnih nesreč niso del programske podpore voznikov v sodobnih komercialnih ali odprtokodnih navigacijskih sistemih. Na podlagi baze 11-letnih podatkov o prometnih nesrečah v Sloveniji smo ugotovili, da različne vremenske razmere oblikujejo različne prostorske vzorce nevarnih cestnih odsekov. Potencialno nevarne cestne odseke smo vključili v mobilni prostorski sistem za podporo odločanju (SLOCrashInfo), ki voznike opozori, ko vstopajo ali zapuščajo nevarna območja cestnega omrežja. Pričakujemo, da se bo s tem sistemom povečala varnost v cestnem prometu.

KLJUČNE BESEDE: GIS, mobilna aplikacija, prostorske podatkovne baze, prostorski vzorci, prometna varnost

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1 Introduction

Road transport remains one of the most important human activities. One of the essential components of road transport efficiency is its safety. The latter is the result of the triangle formed by entities like road infrastructure, vehicles and users (Yannis and Karlaftis 2010; Perrels et al. 2015). The interaction between them is especially pronounced by considering the driver's age (Etehad et al. 2015). Physiological (vision, reaction time) and cognitive functions decline with increasing age, thus 40% of fatal road traffic injuries in the European Union are caused by elderly people (65+ years) (Nagata, Uno and Perry 2010; Etehad et al. 2015). The European Commission reported that by 2030 a quarter of all drivers will be aged 65 and above (Internet 1). However, the social, psychological and financial damage caused by road accidents worldwide is still enormous. Road traffic crashes cost most countries 3% of their gross domestic product (Global status report … 2018). Every year the lives of approximately 1.35 million people are cut short as a result of road traffic crashes. Between 20 and 50 million more people suffer non-fatal injuries, with many incurring a disability as a result of their injury, and road traffic injuries are the leading cause of death among children and young adults aged 5–29 years (Global status report … 2018). These numbers are calling time-efficient and cost-effective applicative actions, in conjunction with recent advances in spatial analysis and GIS technology, to identify road traffic accident Hot Spots and increase traffic safety (El-Said et al. 2019). In that regard, the following risk factors should be considered: speeding, inadequate safety distance, driving under the influence of alcohol and other psychoactive substances, nonuse of motorcycle helmets, seat-belts and child restraints, distracted driving (mobile phones, smoking while driving etc.), unsafe road infrastructure, unsafe vehicles, inadequate post-crash care and inadequate law enforcement of traffic laws (Global status report … 2018). In addition, natural conditions, manifested mainly in the geometrical structure of the road and various weather conditions, play an important role as determinants and co-create the spatiotemporal footprint of road accidents. However, Bergel-Hayat et al. (2013) outlined that weather conditions can be considered as a significant driver of traffic accidents, whether on motorways, or on urban or rural road systems. Moreover, the frequency of traffic accidents simultaneously depends on mobility, on which the weather can have either a positive or a negative impact. Fridström et al. (1995) and Hermans, Wets and Van Den Bossche (2006) concluded that weather conditions can explain 5% of the variability in frequency of traffic accidents at the monthly level. Brodsky and Hakkert (1988) have proven that the weather type dominated by rain is the main meteorological explanatory factor for a higher car accident risk. However, rain can have the opposite effect on the frequency of traffic accidents, as well. Yannis and Karlaftis (2010) discovered that, in some places, the number of road accidents decreased during rainy weather, which can be explained by preventive behavior of the drivers, which at the same time reduces exposure to accidents on road networks. Some studies dealing with temporal variability in the effects of precipitation on traffic accidents point out that the influence of rain on the abundance of road accidents is less if it rained the day before (Eisenberg 2004). This positive anomaly is the result of increased care among drivers who adjust to the given situation. Brijs, Karlis and Wets (2008), who proved the connection between the length of drought periods and an increase in road accidents occurring at the reappearance of rain, further confirmed this theory. These facts lead to the conclusion that surveys investigating the impact of weather conditions on the number and spatiotemporal pattern of road accidents are very important for the preparation of appropriate mitigation measures and strategic planning to increase traffic safety.

Understanding the causes, position and time dynamics of road accidents is thus crucial for realizing this goal (Xie and Yan 2008). However, the spatiotemporal pattern of traffic accidents is rarely random. Most often traffic accidents form significant concentrations along a road network, called Hot Spots, Black Spots or Death Spots (Aguero-Valverde and Jovanis 2006). These dangerous sections of the road system usually form because of typical traffic load (Black 1991). Of course, other factors that shape the spatial distribution of these negative events are also important: natural and environmental determinants (steep slopes, sharp turns), weather (rain, snow, wind, fog and black ice), the configuration of the transport network with the number of entry and exit points, defective design and maintenance of roads and motorways, etc. (Xie and Jun 2008). The spatial data analysis known as Point Pattern Analysis has frequently been used by spatial statistics that have developed various methodological approaches to identify hot spots based on point events (Bailey and Gatrell 1995; O'Sullivan and Unwin 2002; Xie and Yan 2008). Often, the kernel density estimation method, now based on road complexity (Okabe, Satoh and Sugihara 2009), is at the forefront and can be traced in numerous studies considering road accident analysis (Anderson 2009), risk analyses for cyclists

based on traffic density (Delmelle and Thill 2008), the detection of critical areas for pedestrians (Pulugurtha, Krishnakumar and Nambisan 2007), the analysis of animal collisions (Krisp and Durot 2007; Colino-Rabanal and Peris 2016), or in the analysis of hot spots on the motorway network (Erdogan et al. 2008).

However, there is no doubt that road accident Hot Spots are important spatial information with considerable applicative value (Savas Durduran 2010), but none of the modern commercial or open-source navigation systems provides this for the user or customer. From that perspective, we aimed to reveal the weather-related spatial pattern of the road accidents in Slovenia. In addition to our findings, a mobile application was developed that warns drivers when they enter and leave sections of road that have been identified as significant road accident Hot Spots under various weather conditions. Thus, the following research issues were addressed: (1) which municipalities in Slovenia are most exposed to road traffic accidents and are thus suitable for preventive action implementation; (2) which are the specific characteristics of road traffic accidents in the selected municipalities (study areas); (3) whether the spatial Hot Spot pattern in the study areas differ in different weather situations; and finally, (4) whether those results can be applied in the form of a mobile spatial decision support system that raises driver awareness when entering or leaving predefined danger zones along the street network.

2 Methodes

2.1 Databases

In order to secure the road network vector data, the national public infrastructure database (GJI) was obtained from the web platform of The Surveying and Mapping Authority of the Republic of Slovenia (Internet 2), which operates under the Ministry of the Environment and Spatial Planning. In the next step, the traffic accident data were downloaded from the Slovenian Police website (Internet 3) owned by the Ministry of the Interior. These data were collected by the Police at each reported traffic accident along the existing street network in Slovenia and can be downloaded for 1995 onwards in CSV format. We transformed this database (considering the time window 2006–2017) into a geospatial format in order to identify potential significant road accident Hot Spots along road network segments in the study areas in different weather conditions. All the required information (GPS location, traffic accident type and weather conditions at the events etc.) were provided in the CSV file. To calibrate the potentially identified significant road accident Hot Spots, a third database was obtained. Here, the national OPSI [Slovenia Open Data] platform (Internet 4) was used to obtain traffic load data in the same time period (2006–2017). This is collected at predefined locations but can be interpolated by applying Spatial Analysis along Networks (SANET) tools (Okabe, Okunuki and Shoiode 2006).

2.2 Study area

By analyzing the 2006–2017 time interval of road traffic accidents and its geospatial pattern in Slovenia (Figure 1), we selected the four most prominent municipalities (according to road traffic accident frequency and traffic load data) for detailed analysis and mobile spatial decision support system (SDSS) development, owing to computation capacity limits. All four municipalities (Ljubljana [LJ], Maribor [MB], Celje [CE] and Koper [KP]) are located along the main Slovenian transport corridor axis (A1), which runs from NE to SW (Figure 2). Ljubljana, the capital city, lies right at the intersection with another Slovenian transport corridor running from NW to SE. Maribor, as the second largest urban area in Slovenia, and Celje stand out in road traffic accident frequency, as well. Koper is a special case, especially in the summer months owing to higher traffic load caused by tourism.

2.3 Structure and properties of road traffic accidents in the study areas

To understand the spatial footprint of road traffic accidents in the study areas, all information in the databases (number, time, traffic accident type [death, serious or minor injury or just material damage], road type [highway, high-speed road, primary road, secondary road, tertiary road, town street network, etc.])

and weather conditions (clear sky, cloudy sky, rain, snow, wind and fog) were analyzed. Collision types (rollover, frontal collision, lateral collision, chain collision, pedestrian collision, animal collision, collision with an object and collision with a standing or parked vehicle) were also analyzed. The SPSS statistical toolkit was used to generate the contingency tables and descriptive statistics parameters.

2.4 Road traffic accident spatial pattern analysis

In the next step, all road traffic accidents, along with the outcome death, major or minor injury or material damage between 2006 and 2017 in different weather conditions (sunny, cloudy, rainy, snowy, windy and foggy) in the study areas were combined to develop point input layers for identifying Hot Spots along road network segments based on the network kernel density estimation algorithm (Kernel type = Equal split continuous at nodes, Band width = 300 m) within the SANET tool (Okabe, Okunuki and Shoiode 2006) for ArcGIS. The second input comprised the network dataset built with the corrected (linked) national road vector layer. Additionally, weightings were applied by considering the traffic load data for each study area and weather conditions. These were initially interpolated across road networks in the study areas by applying the Interpolation algorithm within SANET (Interpolation Type = Inverse Distance Weighting, Band width = 300 m). Finally, to compare the identified Hot Spot pattern in each study area and weather conditions, the average Kernel density variable was transformed to raster format and compared with band collection statistics (Pearson's correlation coefficient) in ArcGIS. Thus, the similarity or dissimilarity in the road traffic accident Hot Spot pattern was evaluated.

2.5 SDSS (SLOCrashInfo) development

Identification of significant Hot Spots along road networks in different weather conditions is a highly applicative result. A spatial decision support system for Android mobile devices in the study areas was developed by using the Hot Spot database, Mapbox Maps SDK for Android, SpatiaLite database, GraphHopper Routing Engine, OpenWeatherMap API and Kotlin programming language (Figure 1). The app is also linked to

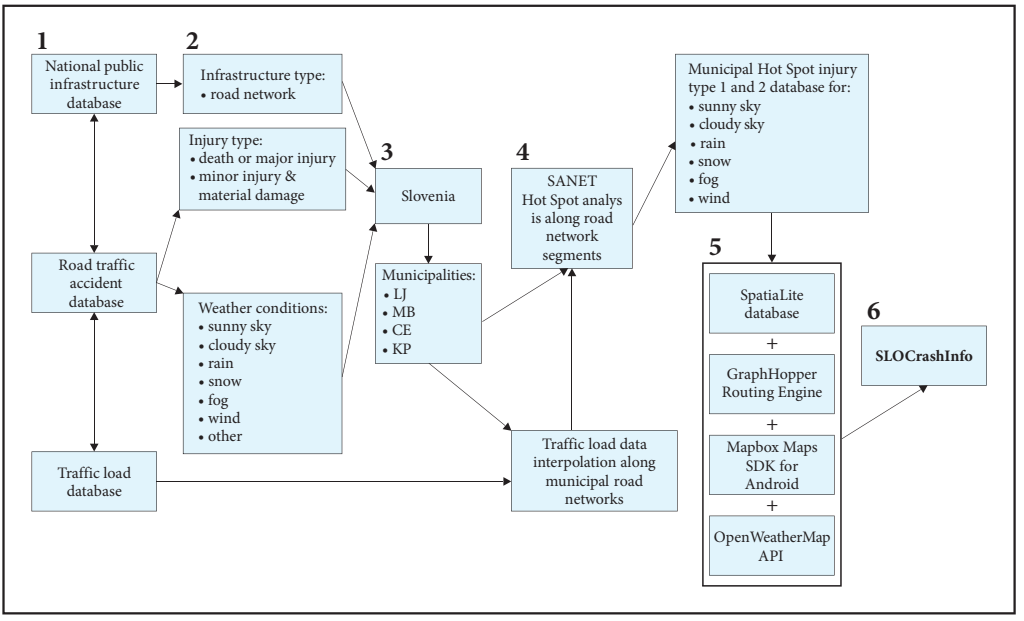


Figure 1: The schematic view of the SDSS development. 1= database integration phase, 2=database filtering phase, 3=spatial extent filtering phase, 4=spatial analysis phase, 5=programing phase and 6=SDSS applying phase.

the weather forecast (utilized OpenWeatherMap API) and thus adjusts the Hot Spot footprint provided for a given study area, depending on the actual weather situation. The SLOCrashInfo app can be downloaded at http://185.164.136.112:21201/slocrashinfo/slocrashinfo.apk.

However, to better visualize the SLOCrashInfo SDSS integrated results in this paper, a hexagon network (diameter = 500 m) was developed across all study areas with the Generate Patterns of Repeating Shapes tool in ArcGIS, since road segments identified as Hot Spots are linear structures, which are barely visible at the municipal level. However, this was done only to prepare Figures 2, 3, 4 and 5. The SDSS app operates with raw vector line data, where each critical road segment is clearly recognizable on the OpenStreetMap road network.

3 Results

3.1 Road traffic accident frequency and distribution in Slovenia

Between 2006 and 2017, 171,119 GPS-recorded road accidents occurred in Slovenia. In 45,493 (26.6%) of these situations, no injuries were recorded; 43,588 ended with major injuries (25.5%), 6202 with serious injuries (3.6%) and 1278 (0.7%) with a fatal outcome. Most accidents occurred on Fridays (17.1%) and Mondays (14.7%), with 25.5% of all traffic accidents occurring over the weekend. The highest share of traffic accidents was recorded in July and August (9.0% of all road accidents), followed by June (8.9%) and May (8.8%). During the day, traffic accidents were concentrated in the afternoon. More than a third (27.0%) of road accidents occurred on regional roads, 17.9% in settlements with a street network system and 17.2% in settlements without an existing street system. In 18.4% of road traffic accidents between 2006 and 2017, speed limits were exceeded; in 17.3%, an incorrect driving side or direction was the main cause of the accident, and in 16.8%, incorrect operation of the vehicle.

Adverse weather conditions were present by 13.8% of all road accidents: most frequent were road traffic accidents in rainy conditions (9.7%), followed by snow conditions (2.7%), fog (1.3%) and high wind situations (0 .1%). The road surface was dry in 70.0% of cases, wet in 22.0% and slippery in 2.8%.

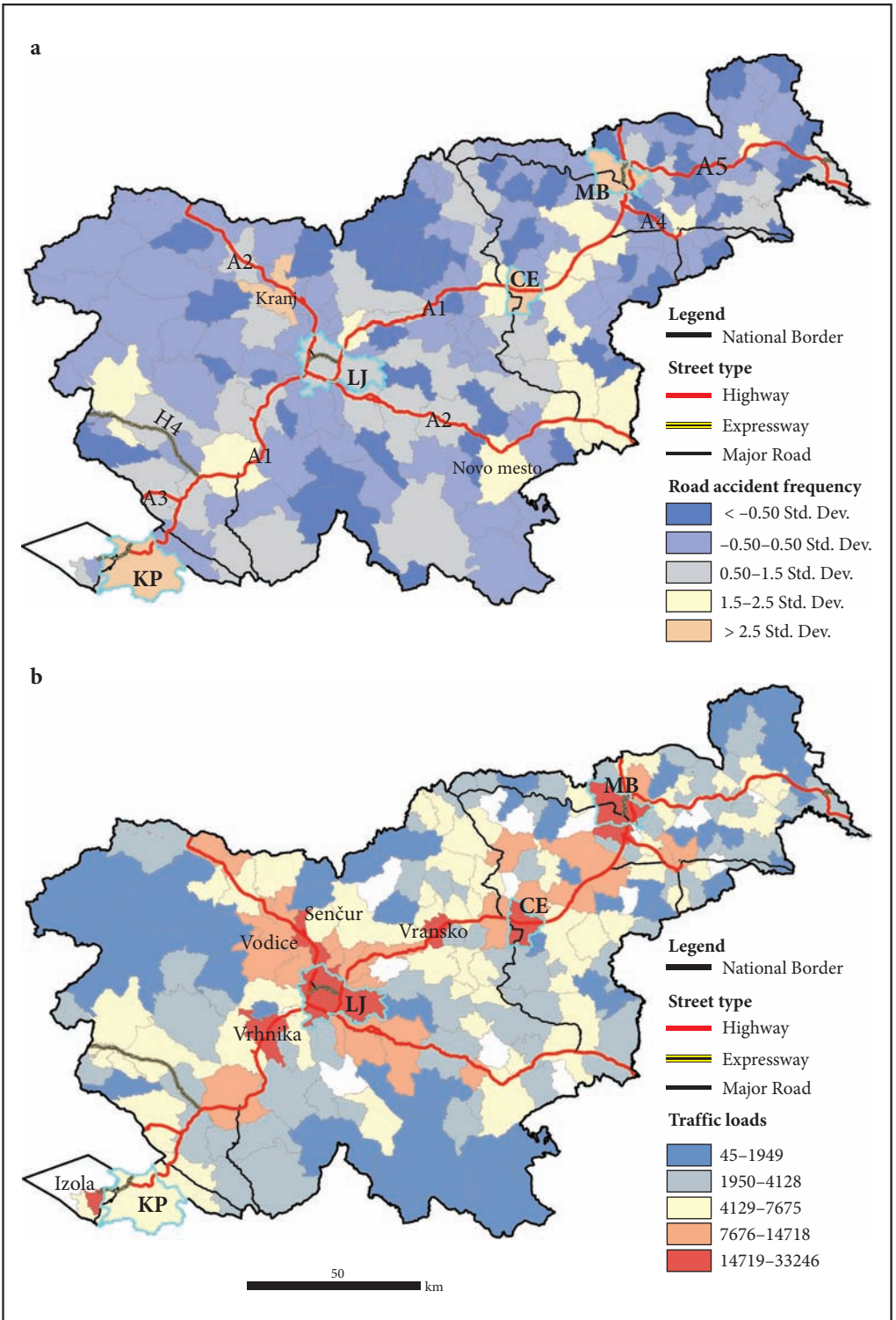
In the next part of the research, we focused on the four most prominent municipalities (LJ, MB, CE and KP), owing to computation capacity limits; the four were selected based on road traffic accident frequency and traffic load between 2006 and 2017 (Figure 2a, b). The spatial frequency pattern of road traffic accidents is correlated with traffic load, since Slovenia is a typical road transit country.

3.2 Road traffic accident characteristics in the study areas

Among the 29,071 traffic accidents that occurred in the four municipalities during the period 2006–2017, the most (13,843) occurred in LJ, followed by MB (7354), CE (4214) and KP (3660). In CE, 32.9% of recorded cases ended with minor and major injuries or with fatal consequences, 31.2% in MB, 26.4% in KP and – surprisingly – in a smaller proportion in LJ (23.3%), despite its having the highest frequency of traffic accidents. The weekly traffic accident regime did not differ significantly between the study areas: the highest proportion of road accidents occurred on Fridays (between 16.4% and 18.8%), but KP stands out, owing to its tourism orientation, by having a clearly higher traffic accident frequency on weekends (Saturday, Sunday). This fact can also be traced by breaking down the monthly regime of road traffic accidents in the study areas. In KP, more records of these unfortunate events were reported in July (11.1%) and August (10.9%) during the summer holidays and the tourist season. By considering the day interval, all study areas had a traffic accident frequency peak between 3pm and 4pm, thus indicating a classic daily employee migration cycle. The minimum (0.9%) was detected between 2am and 4am.

There were 11.4% weather-related traffic accidents in the study areas. The highest share belonged to CE (13.2%) and LJ (11.5%), while MB accounted for 10.9% and KP for only 9.7% (Table 1). Most of the traffic accidents occurred in rainy weather (2,594 or 8.9%), with CE standing out (9.7%). Among the weather situations under consideration, snow-related traffic accidents were frequent in LJ, MB and CE (478 or 1.6%).

Figure 2: Road traffic accident frequency (in SD categories) in Slovenian municipalities (a) and the corresponding average traffic loads (no data in white) between 2006 and 2017 (b). The selected study areas (the municipalities of Ljubljana [LJ], Maribor [MB], Celje [CE] and Koper [KP]) are outlined in turquoise. ►


a
A5
MB
A4
A2
Kranj
CE
A1
LJ
A2
H4
A1
Novo mesto
A3
KP
Legend
National Border
Street type
Highway
Expressway
Major Road
Road accident frequency
< –0.50 Std. Dev.
–0.50–0.50 Std. Dev.
0.50–1.5 Std. Dev.
1.5–2.5 Std. Dev.
> 2.5 Std. Dev.
b
MB
CE
Senčur
Vodice
Vransko
LJ
Vrhnika
Izola
KP
Legend
National Border
Street type
Highway
Expressway
Major Road
Traffic loads
45–1949
1950–4128
4129–7675
7676–14718
14719–33246
50
km

Here, CE was again in front with 2.6%, while – understandably – this share was the lowest in KP (0.2%), which is characterized by a milder and windy sub-Mediterranean climate. However, if we normalize the absolute frequency of road traffic accidents in each municipality with the corresponding number of days of each weather situation between 2006 and 2017 (Table 1), we can conclude that snowy condonations yielded the highest risk for a traffic accident exactly in KP. Owing to low snow frequency, winter tires are not obligatory there, resulting in chaotic road traffic whenever snow does occur. Moreover, traffic accidents in extreme wind conditions were recorded only in KP (0.3%). Foggy weather conditions are common in LJ and CE, owing to their geographic position in the bottom of relief basins (the Ljubljana basin and the Celje basin); thus, 2% of all traffic accidents in fog happen in those two study areas.

3.3 Road traffic accident spatial patterns and the SLOCrashInfo SDSS

The road traffic accident spatio-temporal database that we developed revealed that these unwanted events appeared on different road segments of the street network in all study areas depending on the given weather situation (Table 2). Most of the identified danger zones or Hot Spots were in accordance with clear and cloudy atmospheric conditions. Clearly, other road traffic accident causes must be playing the major role here. However, the spatial Hot Spot footprint under clear and cloudy conditions is significantly different compared to other weather situations in all study areas and is thus still highly informative for the driver, regardless of its weather-independent origin. In LJ, the highway bypass ring, in particular the entrance and exit segments, is highly susceptible to traffic accidents in clear and cloudy conditions. Most of the deadly outcomes happened on these high-speed roads (Figure 3a, b). Dangerous road segments outside the highway

Table 1: Weather-related road traffic accident numerical summary in the study areas, additionally normalized with total number of days for each considered weather situation between 2006 and 2017.

Weather	Variable	CE	KP	LJ	MB	Total
Sunny sky	F	2402	2563	6930	3997	15892
	%	57	70	50	54	55
	$F_{normalized}$	7	2	16	7	32
	$\%_{normalized}$	76	61	76	70	73
Cloudy sky	F	1118	665	4546	2404	8733
	%	27	18	33	33	30
	$F_{normalized}$	1	1	3	2	7
	$\%_{normalized}$	12	18	15	19	15
Rain	F	407	326	1212	649	2594
	%	10	9	9	9	9
	$F_{normalized}$	0.3	0.2	1	0.4	2
	$\%_{normalized}$	4	7	3	4	4
Snow	F	110	7	235	126	478
	%	3	0.2	2	2	2
	$F_{normalized}$	1	0.4	1	1	3
	$\%_{normalized}$	7	12	5	6	6
Fog	F	40	10	150	30	230
	%	1	0.3	1	0	1
	$F_{normalized}$	0.1	0.1	0.2	0.1	0.4
	$\%_{normalized}$	1	2	1	1	1
Wind	F	0	12	0	0	12
	%	0	0.3	0	0	0
	$F_{normalized}$	0	0.01	0	0	0.01
	$\%_{normalized}$	0	0.2	0	0	0.02
Other	F	137	77	770	148	1132
	%	3	2	6	2	4

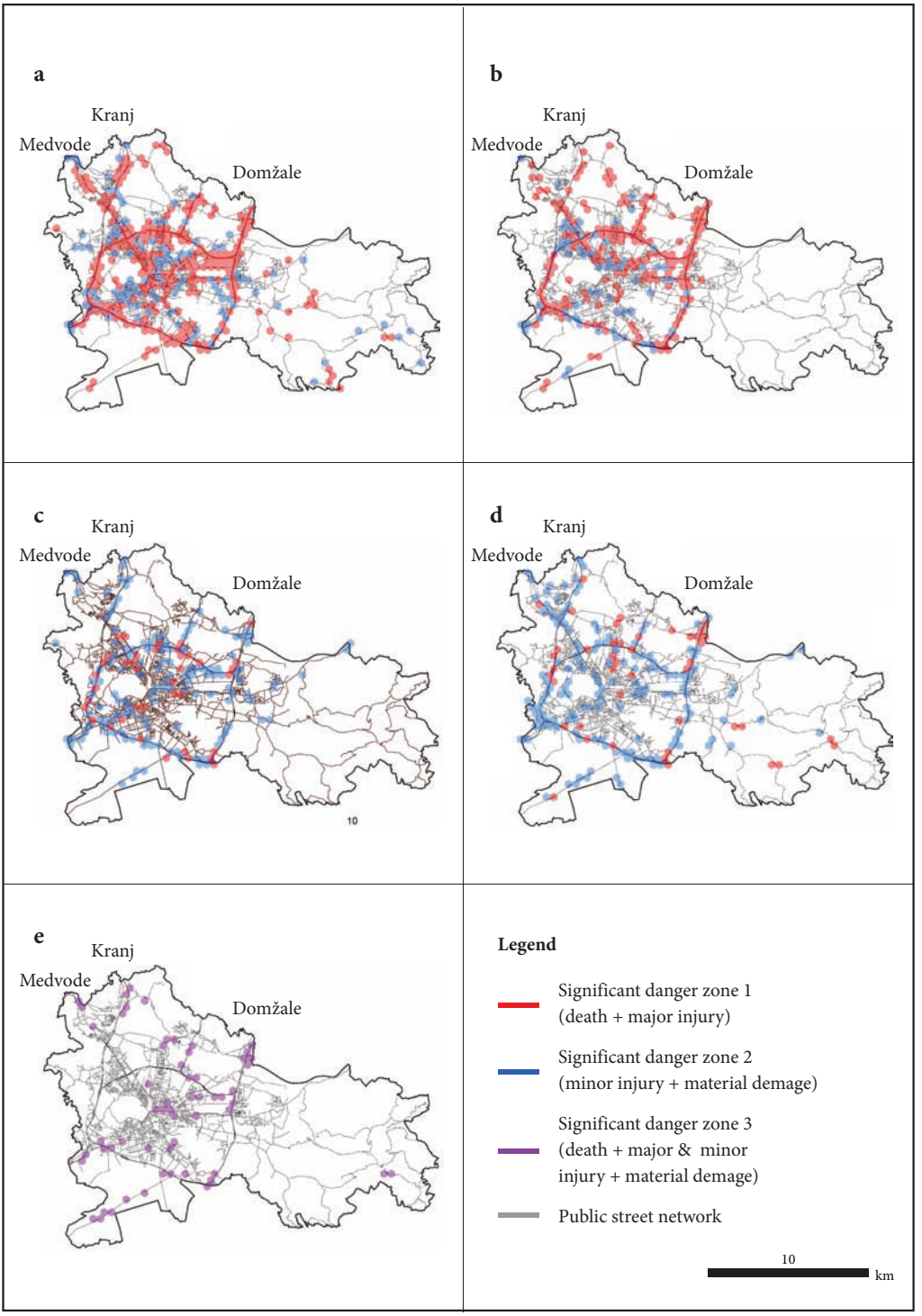


Figure 3: LJ's Hot Spot footprint (general [clear (a) or cloudy sky (b)], rain (c), snow (d), fog (e)).

ring were identified along regional roads 211 via Kranj and 639 via Jože Pučnik airport, and on road 104 to Domžale. Inside the highway ring of LJ, dangerous street segments were mainly identified on three city entrance roads (Celovška street, Šmartinska street and Zaloška street). However, there was a clear difference by comparing the Hot Spots footprint in weather independent (Figure 3a, b) and dependent situations (Figure 3c, d, e). In rain or snow, the junctions between the highway ring surrounding LJ (the highway junctions E and N, E and S, N and W, W and S) experience the most deadly road traffic accidents. In contrast, in foggy weather conditions, streets outside and inside the highway ring are more susceptible at Hot Spots.

In MB, the spatial distribution of Hot Spots in clear or cloudy conditions shows a general footprint where five critical zones can be identified (Figure 4): (1) the H2 road starting with the roundabout in Pesnica and continuing to road 430 (Tržaška street), crossing MB city from N to S; (2) the western entrance from the town of Bresternica to Koroška street; (3) the parallel road on the other side of the river Drava from Limbuš to the roundabout connecting Limbuška and Erjavčeva street; (4) The SE entrance street to Maribor (Ptujska street) and finally, (5) the road segment crossing the river Drava channel in the town of Dogoše (on the SE outskirts of Maribor). As in LJ, the spatial pattern of Hot Spots in rainy, snowy or foggy weather conditions clearly differs from the above-described general situation. Consequently, fewer danger zones were identified in poor weather conditions. Sharp curves, high-speed road entrances and major intersections are typical Hot Spots under these weather conditions in MB. Under heavy fog conditions, dangerous road segments were identified mainly outside the city structure. An individual section of the H2 road stands out here, as well as some curves in the eastern hilly part of the municipality towards the town of Malečnik.

In CE, three zones should receive heightened driver attention: (1) the N-S segment of road 430 from the settlement of Škoflja vas, through Celje city and continuing as road 5 in the direction of the town of Laško, (2) the E-W corridor consisting of roads 107 and 5 from the town of Štore in the direction of the town of Levec, and (3) highway exits across the whole municipality (Figure 5). However, in rainy weather conditions, clusters of Hot Spots are located in the eastern (industrial) part of the municipality, near the town of Štore and at some major road crossings in the city center. Accidents with minor injuries and material damage are linked to the E57 highway and the winding sections of road in the Savinja valley towards the town of Laško. These parts of the road are identified as dangerous in snowy conditions as well. In fog, highway exits in CE are most susceptible to road traffic accidents.

In KP, dangerous sections of road were identified mainly along the H5 and H6 highway and on the roads surrounding the town of Koper (Figure 6). The road network in the rural outskirts of Koper is mostly free of Hot Spots, with a local road exception in rainy weather conditions between the towns of Sočerga and Buzet (in Croatia). However, the frequent Bora wind does leave behind a road accident footprint, which clearly differs from the general or other weather-dependent Hot Spot spatial patterns. In this regard, the area around the town of Črni Kal stands out, owing to its geographic position beneath a high limestone plateau, where these katabatic NE winds gain turbulence and speed.

By comparing the Kernel density variable along the street networks in all study areas, similarities or dissimilarities in Hot Spot footprints for different weather conditions were quantified (Table 2). Clear and cloudy conditions leave behind a similar spatial pattern of Hot Spots. However, the highest variability in road traffic accident spatial patterns was identified in KP and MB. Fog and wind were the two weather conditions with the most unique Hot Spot footprints relative to other weather independent (clear or cloudy sky) or dependent situations (rain and snow).

Figure 7 illustrates the activated SLOCrashInfo app. The identified Hot Spot footprint is linked to the OpenStreetMap basemap and to the weather forecast and is automatically adjusted depending on the GPS position of the mobile device in the study areas. The screen frame of the mobile device turns red (Figure 6a) if the vehicle enters danger zone 1 (death, major injury) and automatically switches color when reaching danger zone 2 (minor injury or material damage) or 3 (death, major injury + minor injury or material damage) (Figure 6b), or turns off when the Hot Spot section of the street network has been left behind. Sound alerts are not integrated because these could disrupt driver's attention and can be annoying while driving. Thus, drivers are informed about the potential danger and can react accordingly by focusing on the speed limit and safety distance to other nearby vehicles at the given momentum.

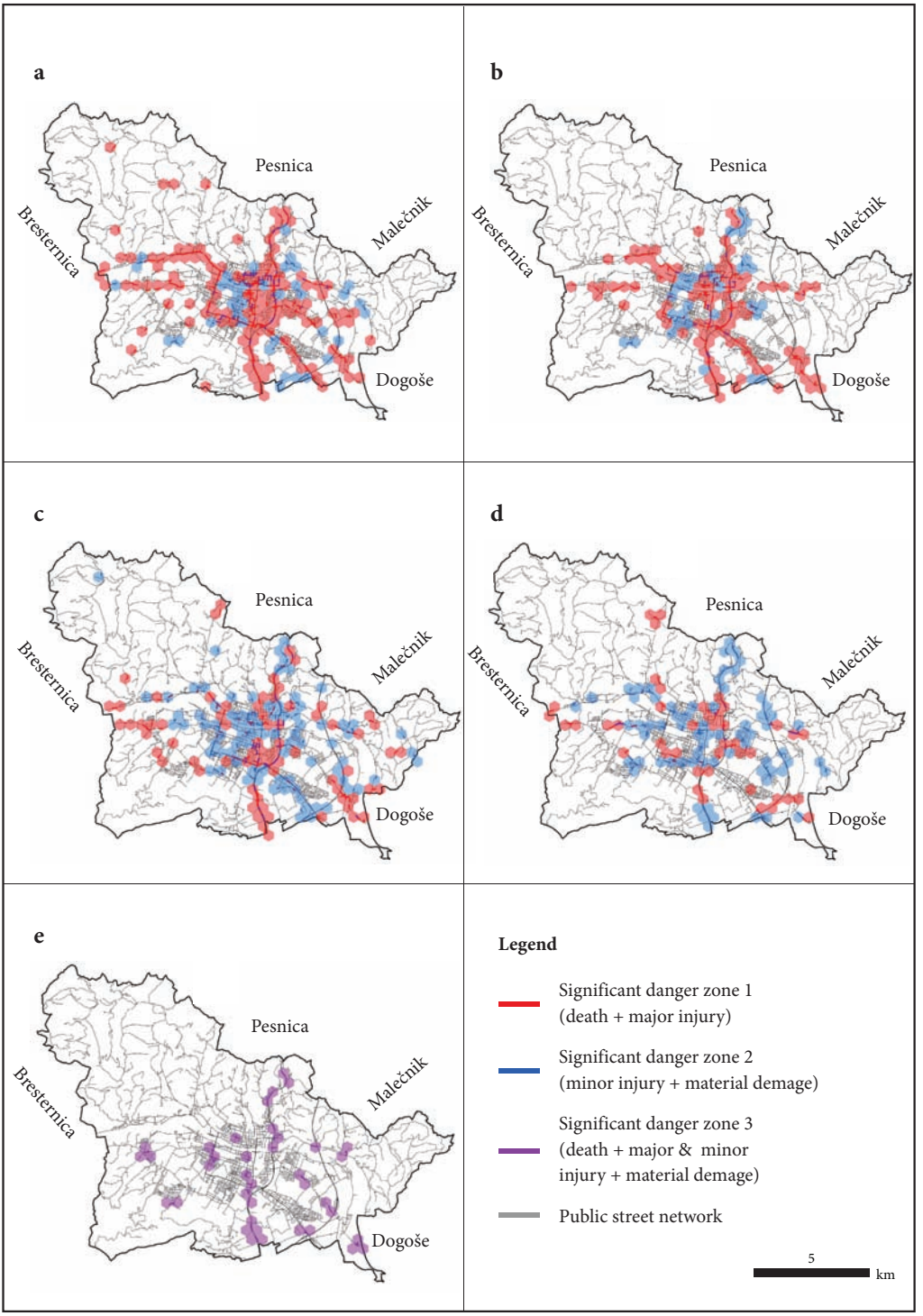


Figure 4: MB's Hot Spot footprint (general [clear (a) or cloudy sky (b)], rain (c), snow (d), fog (e)).

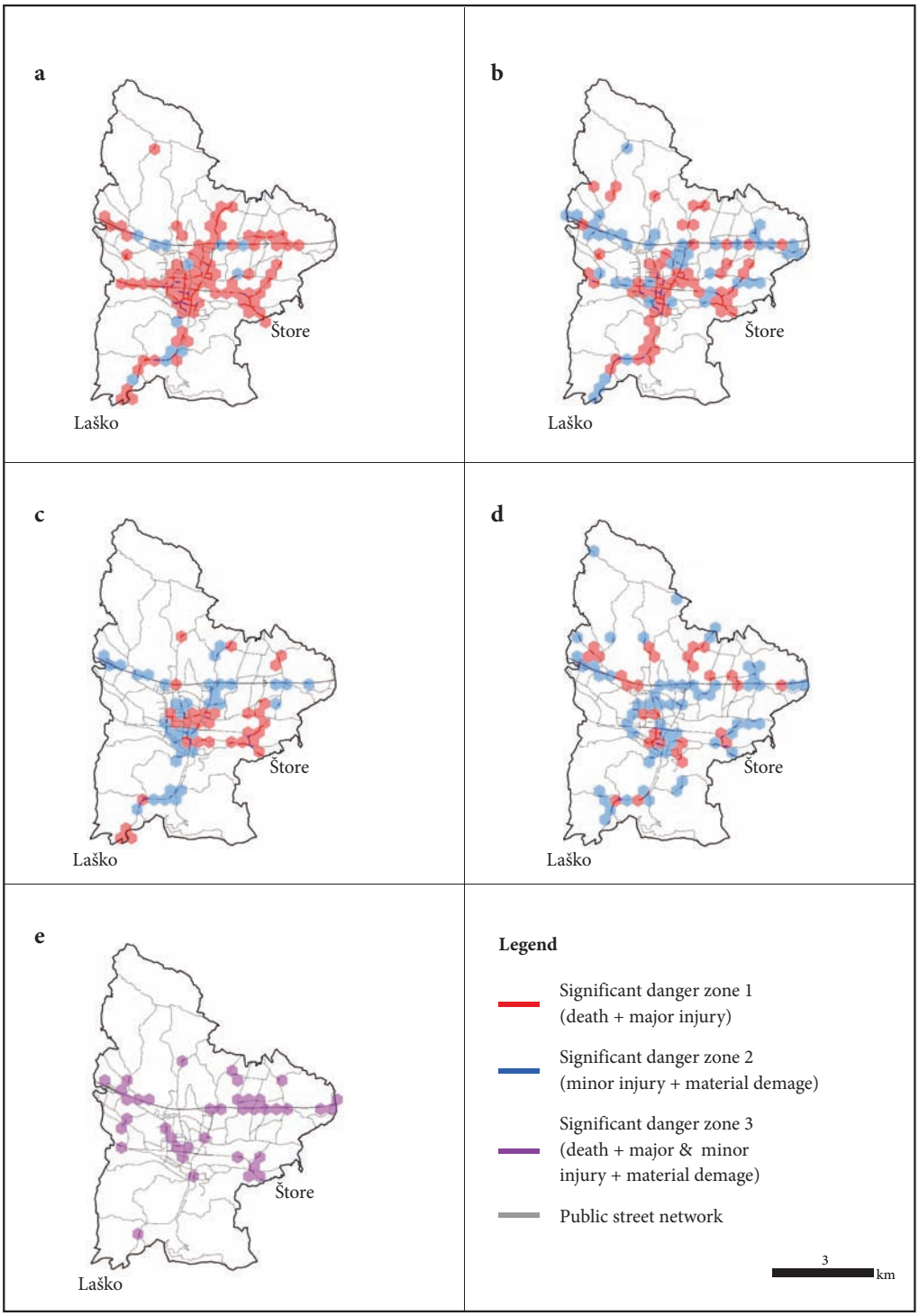


Figure 5: CE's Hot Spot footprint (general [clear (a) or cloudy sky (b)], rain (c), snow (d), fog (e)).

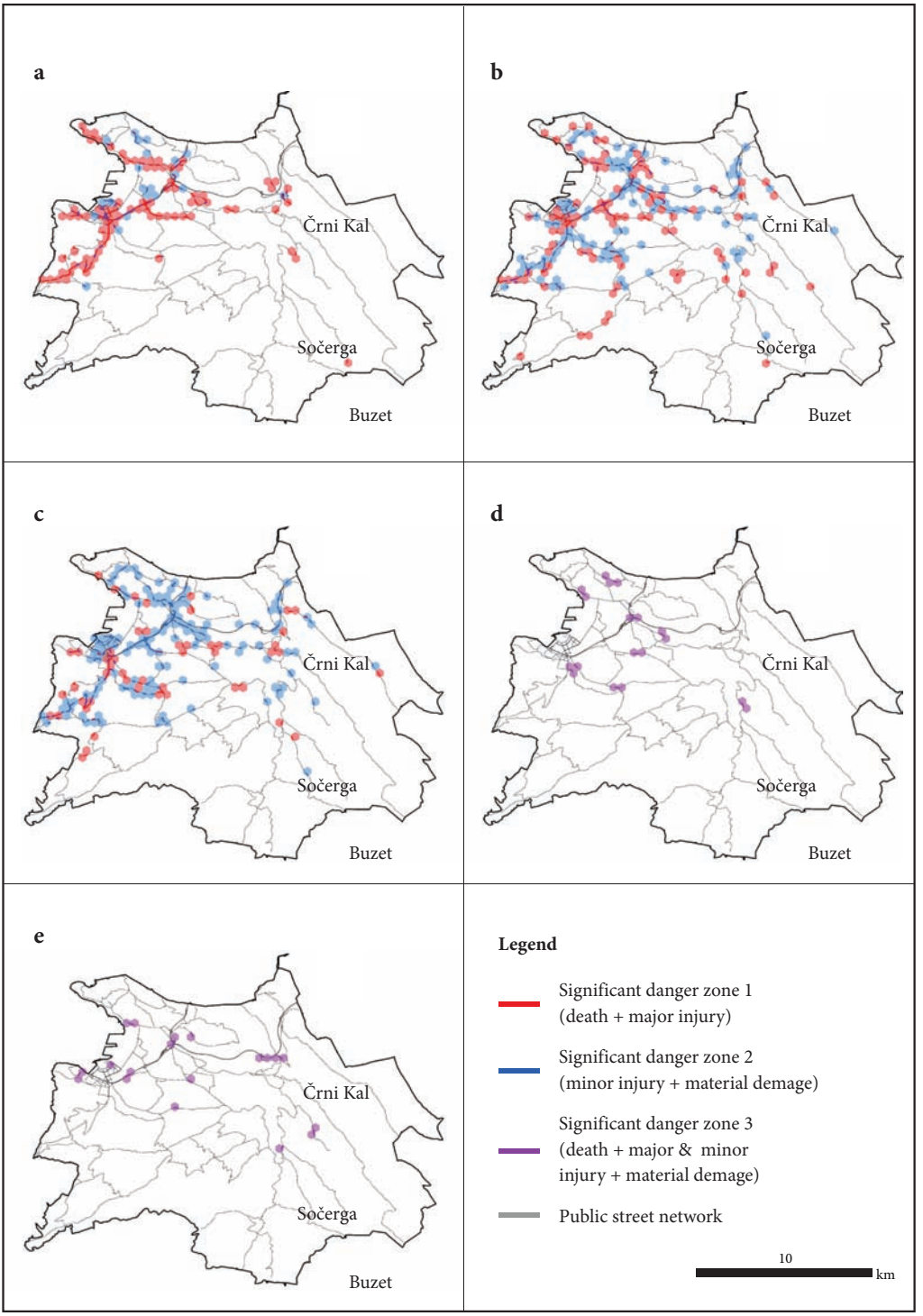


Figure 6: KP's Hot Spot footprint (general [clear (a) or cloudy sky (b)], rain (c), fog (d), wind (e)).

Table 2: Study site- and weather-related correlation matrix (Pearson's correlation coefficient).

Weather condition	Study Area	Clear Sky	Cloudy Sky	Rain	Snow	Fog	Wind
Clear Sky	LJ	1	0.77	0.61	0.47	0.32	
	MB	1	0.87	0.58	0.37	0.24	
	CE	1	0.79	0.52	0.36	0.27	
	KP	1	0.65	0.62		0.05	0.05
Cloudy Sky	LJ	0.77	1	0.76	0.52	0.41	
	MB	0.87	1	0.69	0.35	0.28	
	CE	0.79	1	0.55	0.37	0.29	
	KP	0.65	1	0.87		0.06	0.08
Rain	LJ	0.61	0.76	1	0.42	0.30	
	MB	0.58	0.69	1	0.27	0.23	
	CE	0.52	0.55	1	0.35	0.34	
	KP	0.62	0.87	1		0.03	0.09
Snow	LJ	0.47	0.52	0.42	1	0.28	
	MB	0.37	0.35	0.27	1	0.11	
	CE	0.36	0.37	0.35	1	0.17	
	KP	0.05			1		
Fog	LJ	0.32	0.41	0.30	0.28	1	
	MB	0.24	0.28	0.23	0.11	1	
	CE	0.27	0.29	0.34	0.17	1	
	KP	0.05	0.06	0.03		1	0.01
Wind	LJ						
	MB						
	CE						
	KP	0.05	0.08	0.09		0.01	1

4 Disscusion

Slovenia lies at the conjunction of different climatic zones characterized by differences in air masses and differences in weather phenomena, which further modify traffic safety. When traveling on the NE-SW trajectory, across the Alpine-Dinaric mountain barrier to the Slovenian coast, a driver can experience very diverse weather conditions along the road in only a few hours. However, the Slovenian data show that the frequency of traffic accidents in adverse weather conditions is comparable to that of other European countries (Etehad et al. 2015). Despite improving numbers, road traffic accidents remain one of the main global issues of health and social policy (Goniewicz et al. 2016). In Slovenia, trends in road traffic accident frequency are fortunately clearly negative, as in other European countries, but with significant regional differences. Traffic load plays here an important role, since Slovenia is a typical road transit country. However, studies investigating highway traffic loads (Castillo-Manzano, Castro-Nuño and Fageda 2016) concluded that modern vehicle-to-vehicle communication technologies could support the driver with real-time traffic data and thus prevent road network accidents. Such technology can be seen in the Google Maps navigation system, which is, for now, developed only for the highway network. However, highways tend to be safer than regional, local or urban road systems (Grande et al. 2017). From that perspective, we can highlight some municipalities with larger towns that had higher road traffic accident frequency, although there were some exceptions (municipalities lying within the triangle MB, CE and the city of Novo mesto and along the H4 expressway (Razdrto–Vrtojba) in the SW part of Slovenia). Consequently, the spatial road accident Hot Spot pattern clearly differs in regard to study areas and different weather conditions. Several studies across the Globe (Brodsky and Hakkert 1988; Fridström et al. 1995; Hermans et al. 2006; Brijs, Karlis and Wets 2008; Yannis and Karlaftis 2010; Bergel-Hayat et al. 2013) confirmed the weather dependence (as direct or indirect cause) of road traffic accident, particularly under rainy or snowy conditions. Slovenia is not an exception, rain and snow leave behind the highest share of road traffic accidents in adverse weather but fog and

wind were the two weather conditions with the most unique Hot Spots footprints. However, Romano and Jiang (2017) emphasized that road traffic accident Hot Spots should be considered as spatio-temporal events along road networks. In other words, the road accident footprint is changing with time and is influenced by many factors, including weather. The informative power of such geospatial results is highly applicable and these data, not just can, but should be integrated as a driver assistance system in the coming »smart« vehicles. Our study proves that an information system providing the driver with information about potentially dangerous road network segments in varying weather conditions could have a positive influence on the driver's behavior while navigating these routes. Thus, more attention to speed limits, safety distance

Figure 7: The SDSS application SLOCrashInfo in action (in the danger zone) (a). The Data view mode (b). Live mode in the non-danger zones (c) and Live mode in the significant danger zone 1 (d), 2 (e) and 3 (f).

and other vehicles entering and leaving the system can be expected. Uchida et al. (2017) outlined that mobile devices, such as smartphones, have recently become very effective methods that could help prevent or decrease road traffic accident frequency in general if they are used properly. As already mentioned, the ideal solution for this mobile spatial decision support system would be integration with the vehicle's system, so that dangerous road segments could be indicated with a warning symbol, like the slippery road alert if air temperatures drop below 4°C. Another possibility would be integration with the Google Maps navigation system, which provides in-time traffic updates based on mobile device location. This app could be enhanced with the weather-related Hot Spot footprint data and easily projected into the vehicle cockpit via Android Auto technology (if supported). To do so, national road traffic accident databases should be analyzed. With the recent developments Intelligent Transport Systems such as autonomous vehicles or vehicle-to-vehicle communication systems, which will definitely be equipped with smart geospatial information systems, it is expected that traffic accident frequency will be decrease drastically in the near future.

5 Conclusion

Understanding where traffic accidents occur is crucial for improving road safety and proper traffic enforcement allocation. We detected clear regional differences in road traffic accident frequency connected with traffic load, since Slovenia is a typical road transit country. As expected, municipalities with larger towns had higher road traffic accident frequency, although there were some exceptions. However, different weather situations leave behind different spatial footprints of road traffic accidents. Thus, the spatial road accident Hot Spot pattern clearly differs in regard to study areas and different weather conditions. Despite that, the highest weather-related road accident frequency was recorded in rain and snow, fog and wind were the two weather conditions with the most unique Hot Spot footprints. To address the applicability of such geospatial results, we developed a mobile spatial decision support system (SDSS), functioning in the Android environment that have the potential to improve road safety. Moreover, modern commercial car navigation systems provide many valuable spatial data for the driver but none of them visualizes road traffic accident hot-spots (dangerous road segments) related to weather patterns. Owing to computer limits, our SDSS SLOCrashInfo was designed only for most exposed municipalities in Slovenia. Next steps should thus be orientated towards the whole road network in Slovenia or even beyond national borders. The optimal solution would be an automatic integration of such data into the navigation system of all vehicles, where an alert message could be immediately displayed on the cockpit while entering a traffic accident hot-spot road segment. However, it should be emphasized, that such information systems are only suitable (or necessary) for non-autonomous vehicles, where driving decisions are still in human hands.

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Gastronomy, territory and tourism

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GASTRONOMY TOURISM: A BRIEF INTRODUCTION

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NICK_NICK, SHUTTERSTOCK

Visit of food market is a popular tourist activity.

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Gastronomy tourism: A brief introduction

ABSTRACT: The aim of this article is to provide a theoretical and conceptual introduction for the special issue on the interactions between food and territory manifested in gastronomy tourism. We focus on four perspectives: sustainability, the role of heritage, the potential for rural development and the networking of stakeholders. The contributions critically examine the development potentials but also the weaknesses of the growing gastronomy tourism. The case study approach and qualitative methods provide a detailed and concrete insight into the emerging challenges of host communities, tourism businesses and farmers, public policy makers and visitors. The special issue also provides applicable results for stakeholders involved in the strategic development, creation and consumption of tourism offerings.

KEYWORDS: food, tourism, rural development, qualitative research, culinary experiences, agricultural products, place-making

Gastronomski turizem: kratek uvod

POVZETEK: Cilj uvodnega članka je podati teoretični in konceptualni uvod za posebno številko o povezavah med hrano in prostorom, ki se kažejo v gastronomskem turizmu. Osredotočamo se na štiri vidike – trajnost, vlogo dediščine, prispevek k razvoju podeželja in mreženje zainteresiranih deležnikov. Prispevki kritično ocenjujejo ne le razvojni potencial, temveč tudi pomanjkljivosti rastočega sektorja gastronomskega turizma. Pristop študij primera in kvalitativne metode omogočajo poglobljen vpogled v nastajajoče izzive gostiteljskih skupnosti, turističnih podjetij in kmetovalcev, ustvarjalcev javnih politik in obiskovalcev. Posebna številka ponuja tudi uporabne rezultate za deležnike, ki sodelujejo pri strateškem razvoju, ustvarjanju in potrošnji turistične ponudbe.

KLJUČNE BESEDE: hrana, turizem, razvoj podeželja, kvalitativne raziskave, kulinarične izkušnje, kmetijski proizvodi, ustvarjanje prostora

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1 Introduction

This special issue of Acta geographica Slovenica focuses on the geographical, economic, social, cultural and environmental interactions between food and territory, manifested in the relatively new gastronomy tourism. This type of tourism includes visiting places related to food production and consumption, including cultural events related to preparation processes or eating a special dish as well as seeing how a certain dish is being prepared (Hall et al. 2003). From a geographical perspective, gastronomy tourism is an important co-creator of landscape. It transfers global dimensions with its advantages and flaws into local contexts and re-creates space through cultural innovations. In this way the traditional landscape is transformed into what we can call a »culinary landscape« which reflects the complex relationships in a modern society, and the regional and cultural diversity that different cultural traditions form. Therefore, gastronomy tourism allows destinations to present their cultural uniqueness and diversity as competitive advantage in a globalised world. Gastronomy tourism is supported by global economy and mobility. As Scarpato (2000, 127, cited in Scarpato 2002, 63) stated: »People are travelling more to expand their business, that means they will be experiencing more [...] their palates will demand more and more. We actually have a group of people that have been travelling around the world, whether they're musicians, entertainers, lawyers, corporate businessman or educators (and their travelling) develop an influence of their palate instinct.« Gastronomy, therefore, has become an important criterion in the selection of holiday destinations and leads experiential tourism, such as wine tourism (Dowling 2014). To this end, destinations need to identify and promote the attributes that sustain their image, including specific products made from their own cultural and natural resources (Borzyszkowski, Marczak and Zarębski 2016; Skowronek et al. 2018; Yilmaz, Kiliçarslan and Caber 2020).

Although gastronomy is inherently diffused, partly tangible, partly intangible, it shapes and structures space, mainly through changes in social and economic structures, and land use. Due to its complex nature, it is difficult to accurately and fully understand the historic mechanisms, expressed in heritage, by which it serves as a resource for territorial development (Pérez Gálvez et al. 2017; Perry 2017; Tricarico and Geissler 2017). This is especially true because the territory is a complex construct in which different stakeholders (residents, visitors, investors) interact with their different perspectives, motivations, knowledge, experiences and expectations (Prada-Trigo 2018).

Numerous studies on gastronomy tourism show that the use of gastronomy as an economic resource can have controversial impacts on the host communities. While Bessière (1998) sees local food as a means of cultural tourism experience, and the sale of local food products as a means of strengthening local identity, Carral, del Río and López (2020) remind us that gastronomy tourism does not always contribute to the cultural, social, economic, and territorial development or at least not to the expected degree. This is especially true in a competitive globalized world (Pitte and Moody 2002). As many urban dwellers once lived in rural areas, we need to discuss complex relationships between urban and rural, including a return to »local landscape«, *terroir* (Jamšek Rupnik, Čuš and Šmuc 2016). Gastronomy tourism shortens the spatial and technological distances that have increased due to industrialization and globalization of agricultural food supply chains (Wiskerke 2009) by engaging local actors involved in the food system (farmers, producers and processors, chefs and caterers, festival organizers and managers, policy makers and authorities), and the community. They obtain local skills, historical and cultural practices and traditional knowledge in the production, processing and transformation of products (Vandecandelaere et al. 2010). Therefore, we note regional differences as gastronomy became one of the centrality factors. This development is characteristic of cities, but often not so evident in rural areas, where it influences spatial development and formation of regional identity, for example, through the development of a tourist gastronomic region, a touristscape (Kowalczyk and Derek 2020).

Therefore, there is a need for a continuous scientific discussion on the positive and negative effects of territorialization of gastronomy (Table 1), which is also the aim of this special issue. The most important aspects of the food–territory–tourism triangle are discussed in the papers:

- sustainability in gastronomy tourism,
- the role of heritage,
- contribution to spatial, especially rural development, and
- networking of stakeholders.

These are not new topics in gastronomy-tourism research but due to the growing nature of this economic sector, they still require sufficient attention and a critical approach.

The papers presented in this special issue of Acta geographica Slovenica are based on empirical studies, two of which are comparative. The geographical level of the studies varies from local and regional (Kras region in Slovenia, Minho region in Portugal) to the macro-regional (Mediterranean, Alps), rural areas being the focus of the research, except for one case. One paper analyses the visitors' perspective, namely their satisfaction with gastronomy events, while the others focus on small local businesses, associations and public authorities, responsible for the development of gastronomic tourism offer. The units of the observation are also diverse, ranging from simple ones (a single restaurant or product) to more complex culinary events and culinary experiences (e.g. tours, workshops, routes).

In the following chapter we present the contribution of this special issue in more detail.

Table 1: Some phases in gastronomy tourism development in relation to selected factors, with an increasing added value from left to right (Hall 2002; Hjalager 2002; Richards 2002; Author's consideration).

LEVELS \ PHASES OF DEVELOPMENT	SELECTED FACTORS			
ECONOMIC THEMES				
Phases	Traditional	Modern		Postmodern
Market	Commodities	Goods	Services	Experiences
Economic	Production and marketing, mercantile	Reinventing traditions	Offering new products and services, migration	Consumption, selling know-how to professionals, technology and communication
Collaboration	Unchanged	Enforcing cooperation between existing organizations	Creating new structures, still localized	Creating new structures in a global context
Services	Ingredients	Dishes	Meals	Gastronomic experience
Behaviour	Enjoying the food	Understanding the food		Experiencing the food and exchange knowledge
Visitor involvement	Quality of offer	Quality of service		Quality of experience
SCIENCE THEMES				
Research focus	Region (e.g., development)	Society (e.g., events)		Individual, culture (e.g., narratives)
Research method	Exploring phenomena	Acquiring knowledge		Exploring practices
Tourism	Development of »classic« tourism	Development of »mobile« global tourism		Development of cultural tourism and its »grey zones«, such as religion, industrial heritage, events, festivals, and gastronomy
Focus in geography	Food and wine geography	Culinary geography		Gastronomy geography
THEMES COVERED IN THIS SPECIAL ISSUE				
Level of cultural heritage	Indigenous culture	Globalisation of indigenous culture (homogenisation)		Re-indigenisation of global culture, gastronomy of subcultures (localisation)
Sustainability	Sustainable economy	Non-sustainable economy		Re-sustainable economy
Space/Visitor mobility	Space is local	Relativisation of space, »globalised« local destination		Difuse space, global visitors in a local destination
Rural development	Bottom-up initiatives support local development	Top-down initiatives and formation of programs support local development		Bottom-up initiatives support wider regions and are supported by the global economy
Stakeholder networking	Networking in regions to promote culinary aspects	Top-down networking initiatives, quality standards, certification and branding	Bottom-up networking initiatives, opening of routes and trails, visitor centers and museums	Bottom-up-initiated/top-down-supported/market-based clustering activities between »inner« and »outer« stakeholders

2 Sustainable development and gastronomy tourism

Sustainable tourism reflects sustainable issues in tourism in general, and »*takes full account of current and future economic, social and environmental impacts to meet the needs of visitors, industry, the environment and host communities*« (UNWTO 2017). Since tourism is one of the most important consumers of heritage food, heritage food tourism should follow sustainable practices, expressed through four main principles (Sanagustín Fons, Moseñe Fierro and Gómez y Patiño 2011):

- optimal and responsible use of environmental resources, including the conservation of essential ecological processes and biodiversity;
- respect for the socio-cultural authenticity of host communities and their values in order to build better understanding and cultural tolerance;
- building a viable economy, that ensures socio-economic benefits are distributed fairly and stable employment opportunities are provided and
- creating social services that improve the quality of life (see Tiran 2016) and food security of the host community.

Since access to quality food is expected to become an environmental issue, sustainable development is not only about preserving the past, but also about creating potential for the future (Fernandez and Richards 2021). Through its focus on the local economy, gastronomy tourism establishes a close relationship with these principles of sustainability. They manifest themselves in the expression of cultural heritage and consumption, the means and forms of production, the multiplicity and complexity of social interactions, and local trade (Carral, del Río and López 2020; Polajnar Horvat and Ribeiro 2019). Many (local) groups of heritage producers and consumers in rural areas, such as farmers, fishers and pilgrims, are directly related to food and gastronomy (Timothy 2018). In sustainable gastronomy tourism, visitors are encouraged to participate in the cultural life of the destination, explained and interpreted mainly through the cuisine, local products and all related services (Gheorghe, Tudorache and Nistoreanu 2014). They are also encouraged to behave responsibly in relation to the environment (harmless behaviour in the natural environment, green mobility to reach the destination, waste recycling etc.). However, it remains unclear how the sustainable gastronomy tourism contributes to the sustainable development of rural areas knowing that gastronomy is a key element for the sustainable tourism development of cities and attracts tourists with greater economic resources (Pérez et al 2017).

Numerous behavioural studies aim to investigate how sensitive tourists are to responsible travel, the role they play in it and their capacity to identify sustainable and unsustainable practices in the destinations they visit (see Kim 2012; Buonincontri, Marasco and Ramkissoon 2017; Birch and Memery 2020). The latter was also addressed in the first paper of this special issue, entitled **Culinary events in the Slovenian countryside: Visitors' motives, satisfaction, and views on sustainability** (Topole et al. 2021). The paper provides a detailed analysis of the motives and satisfaction of visitors to culinary events in the Karst region in Slovenia. The survey included 244 visitors to five events of different size, theme, character and history. A significant part of the study was devoted to measuring visitors' sensitivity to sustainable practices at the event they attended. Their observations were similar and did not differ in terms of their age, gender, education or place of residence. They appreciated the high-quality service and the use of local culinary ingredients, but were critical of the poor accessibility of the venues by sustainable transport, namely the lack of public transport, and the excessive waste generation, mainly from disposable plastic cutlery. This paper provides a good insight into possible organizational improvements in the future and draws attention to areas that local authorities should address in the future (e.g. the issue of accessibility by public transport).

3 Role of heritage

The link between (cultural) heritage and food is very close. From a heritage perspective, gastronomy is a mixture of tangible and intangible elements, it embodies the values and meanings of heritage bearers and represents their cultural identity (Richards 2001; Blešić et al. 2014; Pérez Gálvez et al. 2017). From a geographical perspective, food is a tourist symbol of place (Timothy 2018).

Tradition and heritage are an intrinsic resource of any territory (Ledinek Lozej and Šrimpf Vendramin 2020). They are perceived as enablers for economic development, as territorial identity is an economically valuable asset, especially when integrated with creative industries (Kozina and Clifton 2019; Kozina, Poljak Istenič and Komac 2019) – gastronomy sector being one of them (Tricarico and Geissler 2017). Topole and Pipan (2020) point out that the globalisation has localised cultural heritage making it an important distinguishing factor between regions (Leigh 2000).

The important question for gastronomy tourism researchers to reflect on is how heritage is understood, interpreted, and used for tourism purposes by tourism providers and local inhabitants who can convince the tourists something is real and authentic. The concept of heritagisation was established by Bessière (1998; 2013) who studied the role of heritage in local / rural development. Her studies of gastronomic experiences and attractions were the cornerstone for grounding the theory of the indispensable link between heritage and innovation in contemporary (gastronomy) tourism. Building on local initiatives, we can state that the link between heritage and innovation is a crucial element in the development of tourism experiences, which is the last step in the scale of progression of economic value, after commodities, goods and services (Table 1; Pine and Gilmore 1998; Richards 2012; Topole and Pipan 2020).

Two papers in this special issue explore how heritage, tradition and authenticity are perceived by gastronomy tourism providers (restaurant owners, farmers and culinary event organisers) and also how authenticity is perceived by their visitors. The first paper, **Luxury food tour: Perspectives and dilemmas on the »luxurification« of local culture in tourism product** (Poljak Istenič and Fakin Bajec 2021), highlights the discrepancy between the top-down and bottom-up approaches to in creating a gastronomy tourism product, including the selection of heritage elements and their significance. The authors present the process of creating a luxury food tour as a bottom-up initiative by a group of small businesses following the national tourism strategy to create five-star experiences. They point out that the criteria for luxurification from »top« side are often too ambiguous or even contested once thought through the integration of the heritage and tradition on the »bottom« side of the process.

The second paper, **Developing gastronomic practices in the Minho region of Portugal** (Fernandez and Richards 2021) shows how existing local gastronomy, which is a strong element of regional identity, is nowadays influenced by changing consumers tastes and their expectations of low prices. Restaurant owners therefore place great emphasis on the meal experience and less on the origin of ingredients and the introduction of innovations in cuisine. They do not visit local food markets or use other distribution systems for locally produced food, which has concrete territorial implications – it impedes local production, trade and social interactions. If the links between restaurants and the regional food economy are not restored, this can become a long-term threat to local gastronomy culture.

4 Rural development

According to Spilková and Fialová (2012), the »development of rural tourism in its various forms, including gastronomy tourism, represents a potential means of an alternative development strategy and economic activity in peripheral areas«. Gastronomy tourism encourages agricultural development through the promotion of niche and regional products and creates positive effects in terms of revenue and employment (Corigliano 2002; Fernandez and Richards 2021). However, rural development should not only be seen in economic terms but also in the function of building social solidarity in protecting local culture (Polat and Aktaş-Polat 2020). It is interesting to note, that more bottom-up gastronomy initiatives linked to local food producers are often based on a more flexible organizational logic that differs from the structures of conventional tourism (Richards and Russo 2016), probably linked to an increased mobility (Richards 2001). While they integrate into the global economy, including through low-cost airlines and internet-reviews, they strongly support the local economy. Examples of the renewed tradition of sourcing local products include Slovenian chef Ana Roš (Michelin … 2021). Here we can see that the development of gastronomy tourism follows four economic phases, that lead from the local to the global level: First, it builds within existing economic structures and networks, then it integrates material suppliers, creates new types of connections and cooperation, and finally it creates 'intelligent' gastronomy clusters in the economy (Hjalager 2002). It is therefore necessary that such local gastronomy initiatives are supported by wider documents, such as the »new rural paradigm« grounded in the EU's Common Agricultural Policy. The document strong-

ly supports the non-productive functions of agriculture and forestry through multi-level and multi-actor process (Ledinek Lozej 2021). The main feature of this approach is the search for synergies between agriculture and other sectors and the creation of »fertile links« to stimulate them (Ploeg and Roep 2003; Spilková and Fialová 2012; Tišler and Šuligoj 2020).

An example of such a link is the revitalisation and valorisation of local and traditional agricultural products through qualification tools, ranging from top-down European quality schemes (e.g. Protected Designation of Origin, and Protected Geographical Indication) to bottom-up initiatives for territorial or place branding, trademarks and heritage inventories (Barreda 2018). These mechanisms provide an opportunity for initially less competitive locally distinctive products to participate in the globalized, commodity-driven market (Parrot et al. 2002; Ledinek Lozej 2020). They stimulate endogenous economic development especially in areas that lack other distinctive attractiveness (Watts et al. 2005). However, the question remains, 'What is local?', if a product that is supposed to be standardised to some degree is considered authentic and therefore better (Blakey 2020).

Food quality designations and regional brands are a suitable tool for developing sustainable rural tourism as they allow tourists to learn about the social and economic life in a given region, meet producers, visit their workshops or farms, and learn about the resources needed to create quality products (Spilková and Fialová 2012).

Designated local food products and related activities are therefore often included in tourism products and are part of culinary tourism experiences such as culinary events, tours and routes (Kumer et al. 2019). Local food products form »a whole that constitutes a strong and distinctive element and can lead to positive differentiation associated with image, quality and reputation« (Fabry and Zeghni 2014), and can lead to a new relationship between urban and rural areas by the redevelopment of landscapes (Férérol 2018).

However, the expectations of the producers who are entering in certification or branding process are sometimes too high, as shown in this issue's paper **Labelling, certification and branding of cheeses in the southeastern Alps (Italy, Slovenia): Montasio, Bovec, Tolminc and Mohant cheese** (Ledinek Lozej 2021). Paper depicts various collective instruments for valorising cheese products from top-down European and national quality schemes and inventories of traditional agricultural products and heritage, to grassroot initiatives such as Slow Food instruments and local brands. The study finds substantial difference in the use and impact of geographical indications in Italy and Slovenia, as well as dissonance between the expectations of the producers when entering in these schemes and real effects on the small-scale farming (and dairy production) in the study regions.

5 Stakeholder networking

For tourism to develop successfully, actions should be planned and managed responsibly (Pilar and Londoño 2015). Even though democratic inclusion is one of the premises of sustainable development, the multiplicity of stakeholders can hinder the process of shared decision-making in community-based tourism development. Insiders, represented by residents, local business managers and public officials, and outsiders, namely investors and tourists, compete for limited local resources to serve the visitors as well as their own interests. In this way new forms of clustering and networking are created (Vries, Go and Aple 2018), framed by the changing (national and international) legal environment.

Due to the described development from local to globally influenced local service, tourism products, including gastronomy products, are becoming more complex. The changes in gastronomy tourism of rural and urban communities are supported by their wish to attract visitors, entice them to stay longer, spend more money, and encourage them to visit again. It was necessary to develop a package of attractions to capture the attention of today's increasingly demanding clientele (Spilková and Fialová 2012). For the same reason, tourism strategies of destinations promote and encourage development of integral tourism products rather than simple ones (McKercher 2016). Clustering activities and attractions and creating rural tourism products such as tours or routes, stimulates cooperation between local areas, and local agents (Spilková and Fialová 2012).

The complexity of stakeholder networking in different types of tourism products is evident in the fifth paper in this issue, **Models of stakeholder collaboration in food tourism experiences** (Šmid Hribar, Razpotnik Visković and Bole 2021). The study identifies different groups of stakeholders and their motives

to participate in tourism experiences. It presents three emerging models of stakeholder networking, including their hierarchical relationships, the organisational characteristics and challenges, such as financial support, degree of formality, and openness of the network.

The last paper, **Gastronomy as a social catalyst in the creative place-making process** (Razpotnik Visković 2021)**,** changes the focus of the previous contributions – it addresses gastronomy events and discusses the place-making potential of gastronomy in the urban context and its contribution to five important characteristics that define the quality of a place: diversity, liveliness, innovativeness, creativity and openness/tolerance. By analysing the network of stakeholders, who organise and participate at the selected events, the understanding of gastronomy and food as vectors of social inclusion and participation of community members is broadened, going beyond the scope of direct economic benefits.

6 Conclusion

Although gastronomy is multidisciplinary, this special issue shows that geography is certainly able to present its different perspectives. The contributions in this special issue of Acta geographica Slovenica focus on four of them – sustainability, role of heritage, contribution to rural development and networking of stakeholders. The authors have three main objectives. First, they identify and critically asses not only the development potential, but also the weaknesses of the growing gastronomy tourism sector. Followed by the introductory paper, the case study approach and qualitative methods used in the research provide a deep and concrete insight into the emerging challenges of host communities, tourism businesses and farmers, public policy shapers and visitors. Second, the authors identify knowledge gaps in contemporary gastronomy research that should be addressed in the future. Finally, the studies presented offer applicable findings and conclusions for stakeholders involved in the strategic development, creation and consumption of the tourism offer in a given territory.

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CULINARY EVENTS IN THE SLOVENIAN COUNTRYSIDE: VISITORS' MOTIVES, SATISFACTION, AND VIEWS ON SUSTAINABILITY

Maja Topole, Primož Pipan, Primož Gašperič, Matjaž Geršič, Peter Kumer

MATJAŽ GERŠIČ

Chefs from Ljubljana's JB Restaurant, the first Slovenian restaurant listed in *The World's 50 Best Restaurants* (ranked eighty-ninth in 2010), preparing dishes from local ingredients at the fourth Karst Savory Festival in 2018.

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Culinary events in the Slovenian countryside: Visitors' motives, satisfaction, and views on sustainability

ABSTRACT: This paper focuses on five culinary events on Slovenia's Karst Plateau (Kras). It presents visitors' motives for attending these events, their satisfaction with them, and their views on sustainability. These traditional culinary events, which take place in the same gastronomic region, differ in their scale, theme, character, and history. A survey was conducted among 244 visitors, approximately 50% of whom had a university degree. The most important motives for their visit include local cuisine; experiencing something new, different, or special; and exploring natural heritage and especially cultural heritage. Visitor satisfaction is the greatest at boutique culinary events, where the main theme is highlighted more strongly than at large-scale culinary events. The main challenge in terms of the sustainability of culinary events is public transport access to the venues. Significant progress would be made by reducing the amount of disposable packaging made from non-sustainable materials. The key to successful culinary events is high-quality services and ingredients, where the word *local* is key.

KEY WORDS: culinary tourism, gastronomy, cultural heritage, sustainable destination, geography of food, Karst Plateau gastronomic region

Kulinarični dogodki na slovenskem podeželju: motivi, zadovoljstvo in ocena trajnostnosti z vidika obiskovalcev

POVZETEK: Prispevek obravnava pet kulinaričnih dogodkov na slovenskem Krasu. Z vidika obiskovalcev predstavi motive za obisk dogodkov, zadovoljstvo s prireditvami in oceno z vidika trajnostnosti. Tradicionalni kulinarični dogodki v isti gastronomski regiji se med seboj razlikujejo po obsegu, tematiki, značaju in zgodovini. Anketirali smo 244 obiskovalcev, od katerih je imelo kar okrog 50 % univerzitetno izobrazbo. Najpomembnejši motivi za njihov obisk so: 1) lokalna kulinarika, 2) izkušnja nečesa novega, nenavadnega, posebnega in 3) spoznavanje naravne, predvsem pa kulturne dediščine. Zadovoljstvo obiskovalcev je največje na butičnih kulinaričnih dogodkih, kjer je v primerjavi z množičnimi kulinaričnimi dogodki osrednja tema prireditve bolj poudarjena. Glavni izziv z vidika trajnostnosti kulinaričnih dogodkov predstavlja dostopnost prizorišč z javnim prometom. Precejšen napredek bi pomenilo zmanjšanje količine embalaže iz netrajnostnih materialov za enkratno uporabo. Ključ do uspešnih kulinaričnih dogodkov so kakovostne storitve in kakovostne prehranske sestavine pri čemer je ključna beseda »lokalno«.

KLJUČNE BESEDE: kulinarični turizem, gastronomija, kulturna dediščina, trajnostna destinacija, geografija prehrane, gastronomska regija Kras

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1 Introduction

This paper examines how visitors experience culinary events on the Karst Plateau (Kras) by exploring their motives for attending individual events and their satisfaction with the services and products offered, the events' organization, the providers' attitude, and the appearance and cleanliness of venues. In addition, it examines how satisfied they are with the quality of accompanying activities, such as the presentation of the destination, the region, and its cultural heritage, available recreational and other activities, and what their views are on the events' sustainability. Data on the respondents' origin, age, sex, and education are also vital for better understanding their views.

This study explores the quality of culinary events and contributes to their improvement. In this way, the countryside surrounding the coastal tourism destination can become more attractive to tourists and better socioeconomic and environmental conditions can be provided for the local population.

1.1 Culinary events and culinary tourism

Culinary events are one-off events that complement the attractiveness of larger events, such as festivals. They aim to impress visitors with special dishes and unique settings. These events are exceptional if they have a multi-layered effect on individuals, arouse all their senses (i.e., taste, sight, hearing, and experience), and leave them with lasting memories. They broaden the attendees' horizons and provide them with a link between culture, landscape, and food (Smith 2007; Getz 2012). Attendees experience something similar to what Marcel Proust described in his novel *Swann's Way*: eating madeleines (i.e., a sensory experience) triggers an involuntary memory in an individual. Culinary experiences are often presented as »authentic«; that is, historically representative of a locale (Long 2013).

Culinary events enhance culinary tourism opportunities for destinations, and they play a crucial role in promoting regions and creating loyalty to food and wine products (Mason and Paggiaro 2010; Simeon and Buonincontri 2011, Topole and Pipan 2020). What is at the forefront of culinary events may not be the economic aspect, but empowerment of the local community and other social aspects, such as connecting stakeholders, preserving and transferring knowledge, conserving cultural heritage, strengthening identity, intergenerational dialogue, and so on (Bole, Šmid Hribar and Pipan 2017; Šmid Hribar, Razpotnik Visković and Bole 2021). As an element of local culture, food is part of rural capital and, from the perspective of tourism, it is attractive for visitors (Bole, Komac and Pipan 2013). The products of regional tourism emphasize the uniqueness of the region and its community, culture, and heritage (Ledinek Lozej and Šrimpf Vendramin 2020). Local dishes and culinary experiences differ from region to region, and so culinary events allow tourists to experience less well-known or unknown cultures and tastes. Food as part of culinary events enhances the profile of the destination (Bessiere 2001; Cai 2002; Hall and Mitchell 2005).

Traditionally, food as part of hospitality services has had a supporting role and development potential within the larger tourism industry (Šmid Hribar and Ledinek Lozej 2013). It was considered a necessary component of the tourism package. Recently, however, food tourism has been identified as a stand-alone activity or attraction offered in various manners by different organizers (Kumer et al. 2019). People have begun to travel to destinations specifically for the unique food products offered (Quan and Wang 2004). Food events bring positive economic impacts into a rural setting, even in a developing country, where resources can be limited (Hall and Gössling 2016).

1.2 Visitors' motivations

The decision to attend any tourist event is a result of multiple simultaneous motives (Crompton and McKay 1997). For many culinary events, leisure and social benefits appear to dominate among the motives (Getz et al. 2015). In comparison to non-food events, the attendees of food events are more motivated by the idea of finding something new. They are also motivated by an opportunity to socialize with people they know and other people (Crompton and McKay 1997; Weiler, Truong and Griffiths 2004; Blešić et al. 2014; Hattingh and Swart 2016). Compared to other non-food events, they are significantly less motivated by cultural exploration. Nicholson and Pearce (2001) state that food-related events in New Zealand attracted a lower proportion of visitors with specific interests compared to non-food-related events. Food-related

events were primarily viewed by visitors as a consumption and entertainment opportunity. Park, Reislinger, and Kang (2008) studied the motivating factors for first-time visitors to the South Beach Wine and Food Festival in Miami Beach, Florida. The four most important factors are the desire to »taste new wine and food,« »enjoy the event,« »enhance social status,« and »escape from daily routines.« Smith, Costello, and Muenchen (2010) concluded that food, event novelty, and socialization were push motivations for attending a culinary event. These internal factors initiated a need by individuals to make a trip. This is also related to the emergence of the term *foodie* (Topole and Pipan 2020). Food products, support services, and essential services, on the other hand, are external factors and pull motivations for potential attendees. Krajíčková and Šauer (2018) found that for two food festivals in the Czech Republic the most prominent motivations to attend were »to have fun,« »to relax,« and »to taste the favourite meal/beverage [*sic*].« Park, Reisinger, and Kang (2008) point out that motivation not only depends on the theme of the event, but is also influenced by socio-demographic characteristics, the region, and the location of the event. For first-time visitors, tasting wine and food might be more important, but for repeat visitors learning more about food and wine might also be important.

1.3 Visitor satisfaction

Past findings show that food experiences at travel destinations contribute to tourist satisfaction (Bessiere 1998; Boniface 2003; du Rand, Heath and Alberts 2003; Frochot 2003; López-Guzmán and Sánchez-Cañizares 2012; Okumus et al. 2013; Privitera, Nedelcu and Nicula 2018). Consumer satisfaction is one of the main goals in marketing because it is a good predictor of purchase behavior (Erevelles and Leavitt 1992; McQuitty, Finn and Wiley 2000; Tsiotsou and Vasioti 2006). Tourist satisfaction has become a major research area and is the main factor for marketing strategists (Satish and Menezes 2001; Fallon and Schofield 2003; Kozak, Bigne and Andreu 2003; Tsiotsou and Vasioti 2006). In turn, food contributes significantly to tourists' satisfaction with the destination visited. For this reason, it is essential to link gastronomy to tourism because it attracts a very distinct tourist profile with a high economic potential (Ab Karim and Chi 2010; Jiménez Beltrán, López-Guzmán and Santa-Cruz 2016). The literature shows that the local gastronomy, the quality and price of food, and the atmosphere are the most important determinants of tourist satisfaction with a destination. The overall food service experience is an increasingly important factor of both tourist satisfaction and dissatisfaction: it can greatly stimulate expenditure but can also cause serious financial losses (Nield et al. 2000; Fox 2007). Abdelhamied (2011) points out that various aspects such as parking space, wholesome and local dishes, and restroom cleanliness are key attributes for satisfied customers.

1.4 Visitors' views on the sustainability of events and their sustainability

Transport of food is an important part of sustainability. The quality of food that travels longer distances is lower compared to food of local origin. Fresh food is crucial for preparing high-quality dishes. Therefore, the modern trend is to bring a consumer closer to where the food was produced, and not vice versa (Nilsson, Griggs and Visbeck 2016). This is especially important for culinary tourism.

Another transport-related sustainability aspect is stimulation of public transport use. Rural tourism can play an active role in promoting the use of public transport – and, conversely, public transport can foster rural tourism. This can have a positive impact on better accessibility for the rural population (Nilsson, Griggs and Visbeck 2016). Richards (2012) argues that tourists that are attracted by culinary experiences see their own transport as the least important factor in visiting a destination. Mode of transport is one of the characteristics that divides mass tourism from sustainable rural tourism, which stimulates walking and the use of bicycles by introducing biking and hiking routes (Regoli, Vittuari and Segrè 2011). Parking infrastructure is visitors' first introduction to the destination (Wijaya et al. 2013). Brunori and Rossi (2000) and Abdelhamied (2011) argue that clean and well-maintained parking lots result in consumers deciding to return to the destination (Hjalager 2002). To promote sustainable transport and reduce the amount of individual journeys by car, Jones (2017) suggested a series of measures for event organizers. She emphasizes the importance of incentives, bonuses, or rewards for attendees.

Waste management and recycling are also part of a sustainable approach to culinary tourism products (Richards 2002). One of the characteristics of rural ecotourism is the efficient use of resources connected with the quantity of waste; this should be decreasing, in contrast to mass tourism, where it continues to increase (Regoli, Vittuari and Segrè 2011). Recently, plastic waste has been the biggest problem (Barnes et al. 2009). According to Ryan et al. (2009), despite the promotion of biodegradable plastic, disposable packaging continues to be composed of regular plastic. Plastic products are very useful in gastronomy, but consumers are increasingly aware of their negative impact on the environment. Therefore, sustainable alternatives are more than welcome.

Canavari et al. (2011) report that, as part of the services offered in the countryside, culinary experiences are also suitable for disadvantaged groups, such as people with mental and physical disabilities. This type of service can be combined with various therapeutic activities (e.g., equine-assisted therapy) that cannot be provided in other environments. According to Kim, Eves, and Scarles (2009) and Vuksanović et al. (2019), there is a difference in attitudes toward culinary events between respondents depending on sex, age group, and education. For example, elderly respondents (51–60 years old) have a more positive attitude toward food and beverages than to everything else offered at the event. Zeppel and Hall (1991) and Glanz et al. (1998) argue that respondents with a higher level of education are more likely to consume local food and pay more money.

2 Methods

The study was conducted in the Karst Plateau gastronomic region in southwest Slovenia, above the Gulf of Trieste, which is one of Slovenia's twenty-four gastronomic regions (Bogataj and Letič 2017), of which each is homogenous, unique, and therefore distinctive (Bogataj et al. 2006). Due to its karst character, the region has no running surface water, which made life quite difficult, especially in the past. Nonetheless, people have lived there throughout history and developed a rich tangible, intangible, and social culture. This historically homogenous area was divided between Italy and Yugoslavia after the Second World War. In the coastal area, economic development was successful, whereas in the surrounding karst countryside it came to a halt due to the changed geographic situation. The situation improved in 2007 with the opening of the border through the Schengen regime (Pipan 2008).

The research methods used included observation and on-site questionnaires with participants in the culinary events. An eight-page structured questionnaire was employed with a set of eighteen questions extracted from literature studying attendees' impressions of food events; four were multiple-choice questions, seven were open-ended questions, six were combined, and one was answered on a scale.

The questions can be divided into four thematic categories. The first category focused on establishing the motives for attending culinary events, assessing their quality, views on the affordability of what is offered at these events, and visitor satisfaction. The second category was connected with the ecological aspect, which indirectly affects visitor satisfaction. It explored the respondents' views on waste recycling, avoiding plastic, public transport arrangements, and so on. This was covered by a special question answered on a scale. The third category examined the methods of informing visitors about specific events, the distance from their permanent residence, and the type of transport they used to travel to the event. The fourth category included questions related to the respondents' demographic characteristics (sex, age, and education).

The questionnaire was tested between May and June 2018 among geography researchers with extensive experience with such a method. The survey was modified based on their comments and suggestions. Four trained researchers surveyed visitors at five culinary events using an on-site intercept procedure. Two of them conducted the survey at each event over the course of the entire day. The goal was to collect perspectives on the event that were as comprehensive as possible. However, many visitors stayed at the event for only part of the day or a few hours, and so not everyone had a comprehensive experience of the event. Visitors were approached randomly, seeking a balanced distribution between the sexes and avoiding distributing questionnaires to more than one person in a group. The respondents within groups were not selected; they volunteered on their own or were designated by the group to answer the questions.

Table 1: 2018 culinary events on the Karst Plateau included in the analysis.

Event	Location	Date	Organizer	No. of visitors (estimated by the organizer)	Year first held	Main theme
9th Karst Plateau Lavender Festival / *9. festival sivke na Krasu*	Ivanji Grad	June 30th – July 1st, 2018	Ekotera d. o. o.	Large-scale event; 2,000–2,500	2010 (first field sown with lavender in 2008)	Lavender-related activities (growing and harvesting lavender and using it in the beauty industry, crafts, and cuisine)
48th Teran Wine and Prosciutto Festival / *48. praznik terana in pršuta*	Dutovlje	August 11th–12th, 2018	Sežana Sports, Tourism, and Leisure Department	Large-scale event (one of Slovenia's best-known and largest culinary events); 8,000	1970	Teran Wine and prosciutto
4th Karst Savory Festival / *4. praznik kraškega šetraja*	Kačiče–Pared	September 9th, 2018	Andrejka Cerkvenik, Belajevi Herbal-Ethnological Farm	Boutique event; 300	2013	Promoting the use of winter savory in cuisine and elsewhere in an inovative way
Opening of Karst Cuisine Month / *Otvoritev Meseca kraške kuhinje*	Štanjel	October 6th, 2018	Planta Society (restaurants and inns from the Karst Plateau) and the Komen Karst Society	Boutique event; 300–400	1996	Introduction to Karst Cuisine Month: sampling traditional Karst dishes and drinks prepared in a unique and modern way
Štanjel Wine Festival (part of the Karst Martinmas Celebration) / *Praznik vina v Štanjelu – del Martinovanja na Krasu*	Štanjel	November 10th, 2018	Komen Karst Society (and Sežana Sports, Tourism, and Leisure Department)	Large-scale event; 6,500–7,000	2014	Presenting Karst wines, with a minor emphasis on Karst dishes

The goal was to survey at least fifty visitors at each event. This number was achieved or even exceeded at all events except the Karst Savory Festival, where only thirty-four surveys could be conducted due to the intense activity at the boutique event. A total of 244 surveys were conducted.

3 Results

3.1 Motivations for attending culinary events

Taking into account all events on the Karst Plateau, respondents reported three main motives for visiting these destinations: local cuisine (40%), experiencing something new, different, and special (35%), and exploring natural and, first and foremost, cultural heritage (34%; Figure 1). Respondents could select more than one answer. Local cuisine proved to be a major motive in four events, with the Karst Plateau Lavender Festival standing out in terms of predominantly non-culinary motives. Without the Karst Plateau Lavender Festival, the share of respondents that prioritized the local cuisine motive would have been 45%. Exploring new places (28%) and visiting a popular area (25%) were also fairly important motives, whereas the remaining motives reported by the respondents were significantly less important in percentage terms (e.g., purchasing products: 17%, recreation (hiking, running, and cycling): 14%, the opportunity to enjoy wholesome food: 12% – with an above-average share recorded at the Teran Wine and Prosciutto Festival and the Karst Savory Festival – and meeting locals: 11%). Six percent of respondents ended up at the event by coincidence because they were drawn by the crowds.

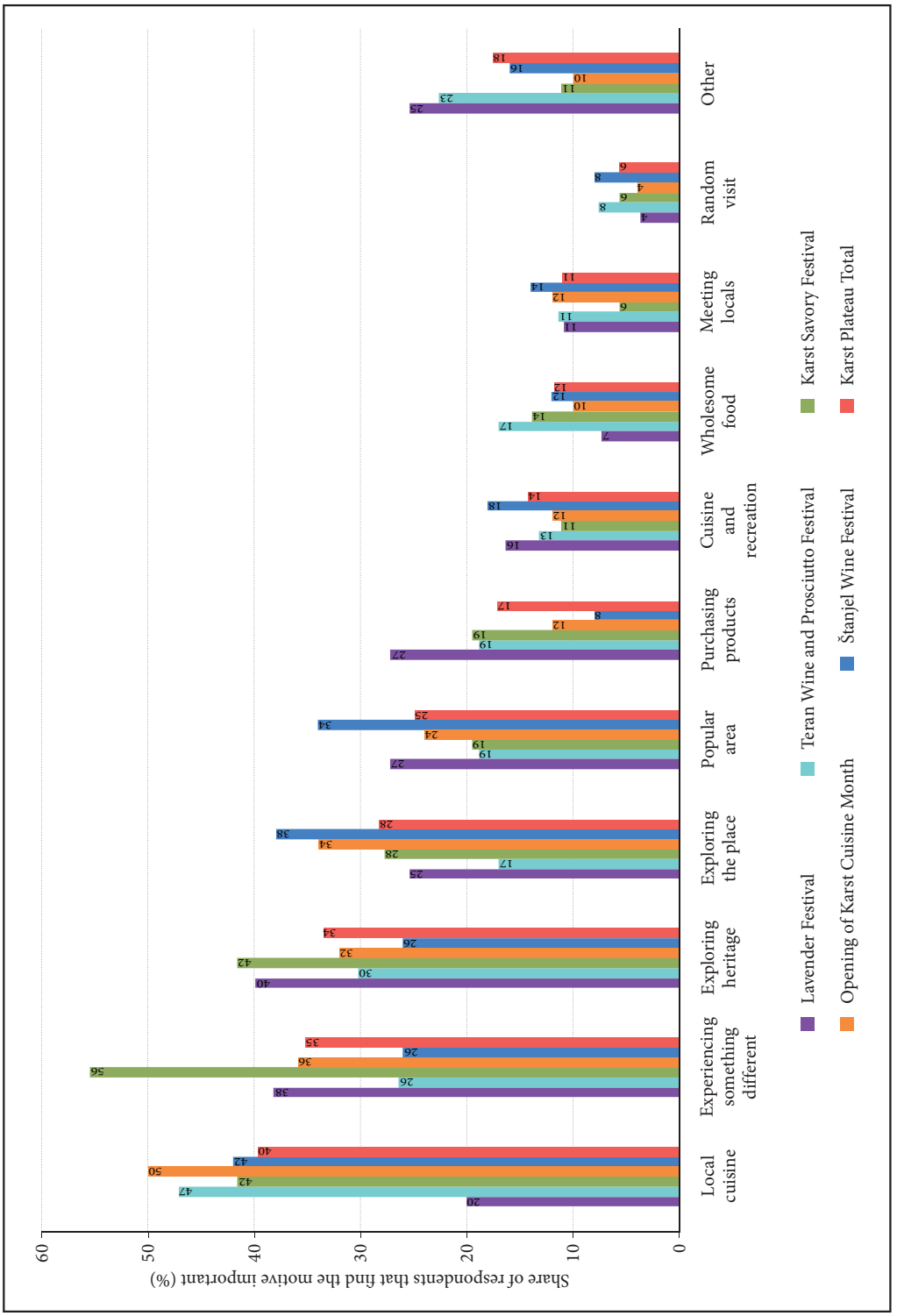
When asked how important cuisine was as a motive to travel to the event, only 9% of respondents replied that it was their only reason to attend the event. Just under a third (32%) reported that cuisine was the most important reason but that they also needed other things to attract them to the event. Respondents for whom food was among the more important reasons to attend the event primarily highlighted the importance of authentic, fresh, home-made, affordable food prepared in a traditional, original way. For 56% of respondents, cuisine was not the primary motive, but nonetheless a welcome addition to the event. Thus, the majority of respondents (i.e., 97%) were more or less interested in cuisine, with only a good 3% reporting that it was completely irrelevant to them; these 3% ended up at the event because they accompanied someone else or by coincidence. Among all the events, the Opening of Karst Cuisine Month has the strongest culinary character, with the strongest emphasis on tasting and exploring karst dishes and drinks. However, this event is also attended by the largest number of people not interested in cuisine (6%). They primarily come for the accompanying activities, which they reported among the important motives for attending the event (Figure 2).

3.2 Satisfaction with culinary events

A good third of respondents (35%) will primarily remember the event for its main theme (Table 1). Among all respondents, 15% were impressed by the event as a whole, and a further 12% were impressed by both the main theme and ambience. A similar share (12%) praised the organization, the organizers' friendliness, and the atmosphere alongside the main theme. Seven percent of respondents will remember the event for its deficiencies or for having had a negative experience. The same share will remember special and random episodes unrelated to cuisine. Nine percent of all respondents could not define what they would remember about the event. It is encouraging that, alongside other impressions, the main theme will be positively remembered by nearly four-fifths of the respondents; this share amounts to a full 94% at the Karst Savory Festival, whereas at the Teran Wine and Prosciutto Festival it is the lowest (i.e., 56%).

Just over half of respondents (52%) were satisfied with the event and did not feel that anything was missing. Their satisfaction was greater with boutique event organizers, who provide unique ambiances and culinary experiences and a link to local cuisine, offer high-quality and wholesome food of local origin produced in a traditional, sustainable way, and are innovative (Figure 3). Around 69% had no comments on the Karst Savory Festival and 64% no comments on the Opening of Karst Cuisine Month, whereas with other, more large-scale events, this share varied between 39 and 50%. In contrast to large-scale events, which

Figure 1: Motives for attending culinary events by importance (n = 244). ➤ p. 114


Share of respondents that find the motive important (%)
0
10
20
30
40
50
60
Local cuisine
Experiencing something different
Exploring heritage
Exploring the place
Popular area
Purchasing products
Cuisine and recreation
Wholesome food
Meeting locals
Random visit
Other
Lavender Festival
Opening of Karst Cuisine Month
Teran Wine and Prosciutto Festival
Štanjel Wine Festival
Karst Savory Festival
Karst Plateau Total

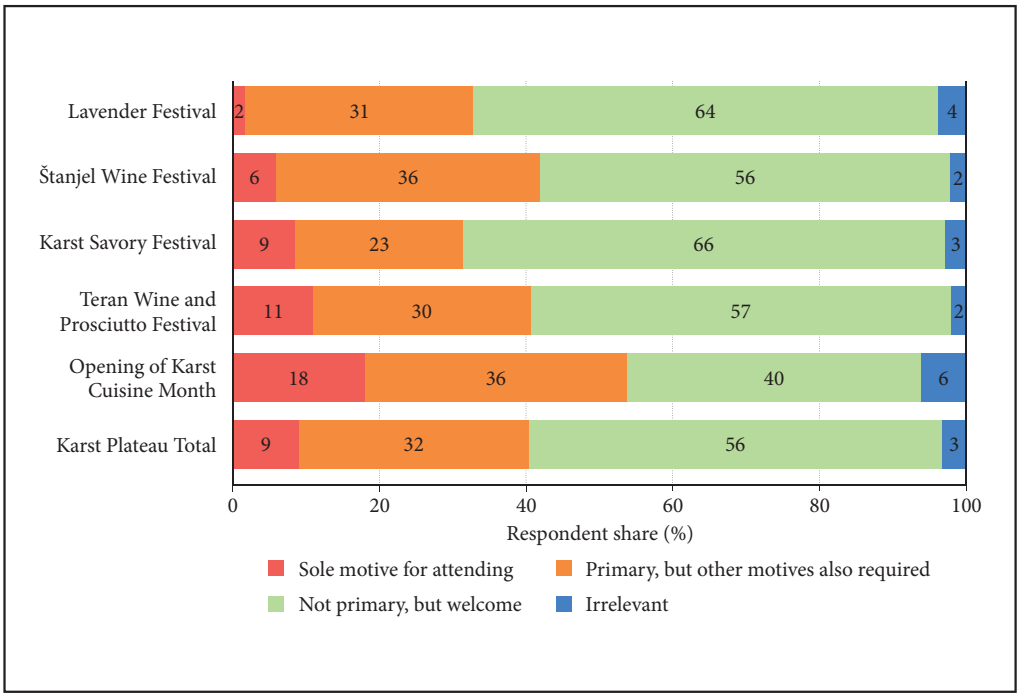


Figure 2: Importance of cuisine as a motive to visit culinary events (n = 244).

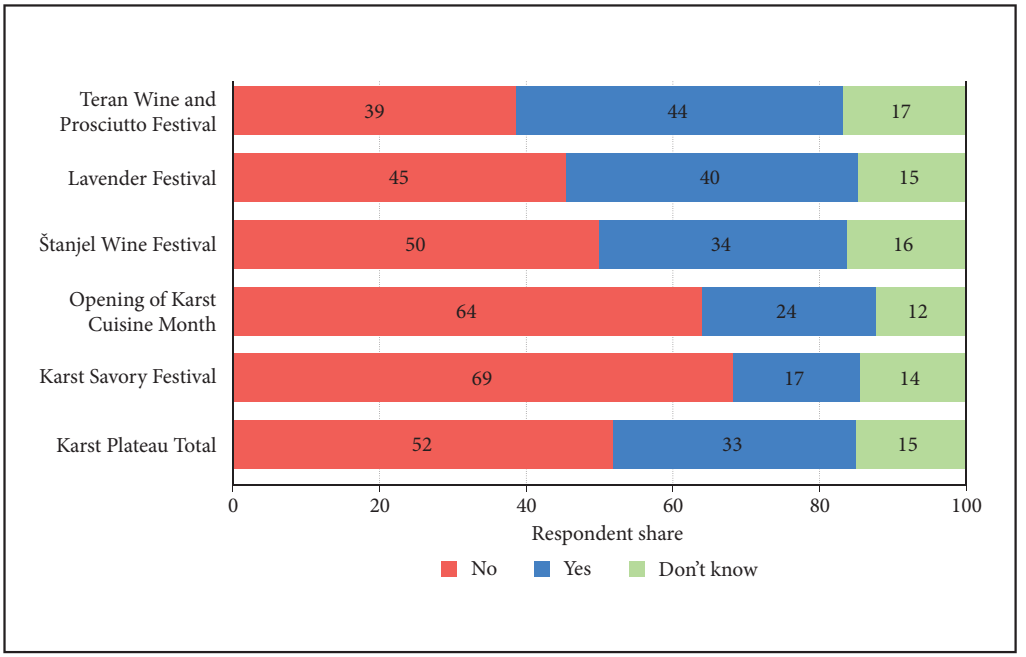


Figure 3: Respondent replies to the question of whether they felt something was missing or noticed any deficiencies in the event's organization (n = 244).

are usually only held once a year and last one day (or a maximum of one weekend), boutique event organizers hold a variety of smaller events from spring to late fall. For example, the various events, workshops, educational walks and excursions, tastings, and musical-culinary events held at the Belaj Farm make up the Herb Festival at the Meeting Point of the Karst Plateau and the Brkini Hills, which Topole and Pipan (2020) present in detail. In turn, the Opening of Karst Cuisine Month is a presentation of farms on the Karst Plateau, which for the entire month offer karst dishes that focus on a different selected ingredient every year.

Taking into account all events, 15% of respondents had no opinion about their quality, and a third (33%) suggested improvements. This third felt that the event needed a more diverse selection of (especially local) food and drinks, an improved or expanded program (better ongoing information on activities, more compact activity, and more local music), and higher-quality technical support (better parking areas, more signs along the road showing the way to the venue, better venue equipment, including for bad weather, and more signs at the venue itself) (Figure 3).

The visitors surveyed largely learned about the events online or from their friends, whose recommendations persuaded them to make the trip. Namely, satisfied visitors are key to promoting individual events.

In evaluating the selection of food and drinks offered at the event, the respondents were also asked to share their views on the organizational and ecological aspects. According to them, the selection of food and drinks is at the forefront at these events (3.9 out of 5). This is especially evident at the Karst Savory Festival (4.2), the Štanjel Wine Festival (4.1), and the Opening of Karst Cuisine Month (4.0).

This is followed by arrangement of parking areas and traffic, waste recycling, cleanliness and the number of restrooms, use of ecological materials, and drinking water accessibility (3.6–3.2). With most events, public transport accessibility was ranked the lowest (2.8) (Figure 4).

Respondents greatly value high-quality services and products, and they are willing to pay more for fresh homemade products. In turn, they greatly dislike unfairly high prices. They are willing to pay more than €25 for superior-quality food and service (42%), a high-quality additional program (20%), a dish requiring more demanding preparation (19%), and more complex event organization (12%).

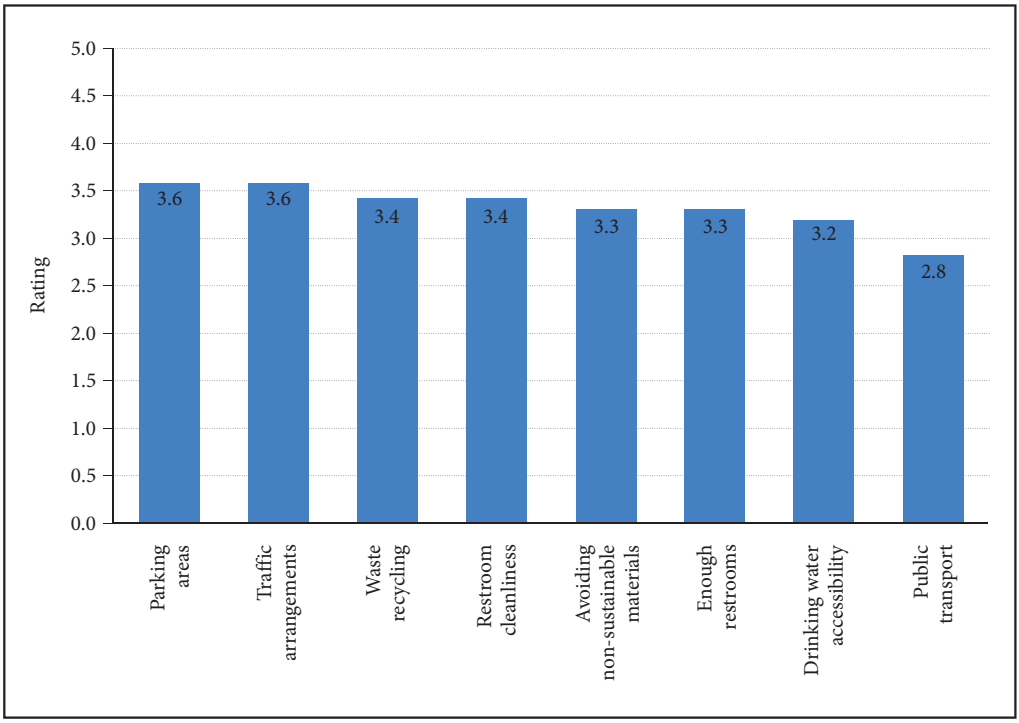


Figure 4: Respondent satisfaction with five culinary events on the Karst Plateau in terms of sustainability (n = 244).

3.3 Sustainability aspects

Among all the events, the Štanjel Wine Festival was ranked highest in waste recycling (3.8 out of 5), and the respondents were least satisfied with recycling at the Teran Wine and Prosciutto Festival (2.5 out of 5). The same applies for single-use materials: respondents believe the Štanjel Wine Festival offered the most biodegradable materials compared to other events (4.2 out of 5). Karst Cuisine Month, held by the same association, was close behind (4.1 out of 5). The Teran Wine and Prosciutto Festival was least sustainable in terms of use of materials (2.0 out of 5).

The Štanjel Wine Festival (4.4 out of 5) also ranked highest in offering sustainable transport in order to travel to the event. They were the only ones offering public transport (a special train line from Ljubljana and a circular Karst Bus Line). In the desire to contribute to sustainable mobility, the Belaj Farm, hosting the Karst Savory Festival, already provided transport from the nearest train station in Divača in the past, but this met with a poor response from visitors because it was too time-consuming.

It is difficult to arrange public transport to culinary events because visitors come from different places. Among the respondents, 83% drove to the event, 8% came in groups with chartered bus transport, and only 5% used public transport. They resort to less sustainable solutions because public transport is very poorly developed in the Slovenian countryside and therefore there are only a few options to choose from. The only exception is the Štanjel Wine Festival, for which a special train was available (from Ljubljana to Štanjel and back via Sežana). The train was used by 16% of respondents, 12% came by charter bus, and two-thirds still drove to the event. Nonetheless, one of the event organizers (i.e., the Sežana Sports, Tourism, and Leisure Department), estimates that the train was selected by a negligible number of all visitors to the Karst Martinmas Celebration, which the Štanjel Wine Festival is part of: approximately 180 out of 6,500 to 7,000. Due to a failure to reach an agreement with Slovenian Railways, this option was no longer available in 2019. The only constant in transport ever since the beginning of the Štanjel Wine Festival in 2014 has been the circular bus route between wine cellars or open-door farms on the Karst Plateau. It has been very well accepted by visitors and therefore the event organizers plan to keep this practice in the future. Less certain is the further provision of the train line from Ljubljana to Štanjel because it is not competitive in terms of duration; it is more than 2 times longer than going by car (cca. 2 hr 30 min compared to 1 hr 10 min). Only passengers that look for entertainment and experience on the way (a music event, socializing with other passengers, admiring the landscape, and so on) are interested in it, but at the same time these also demand greater comfort on the train.

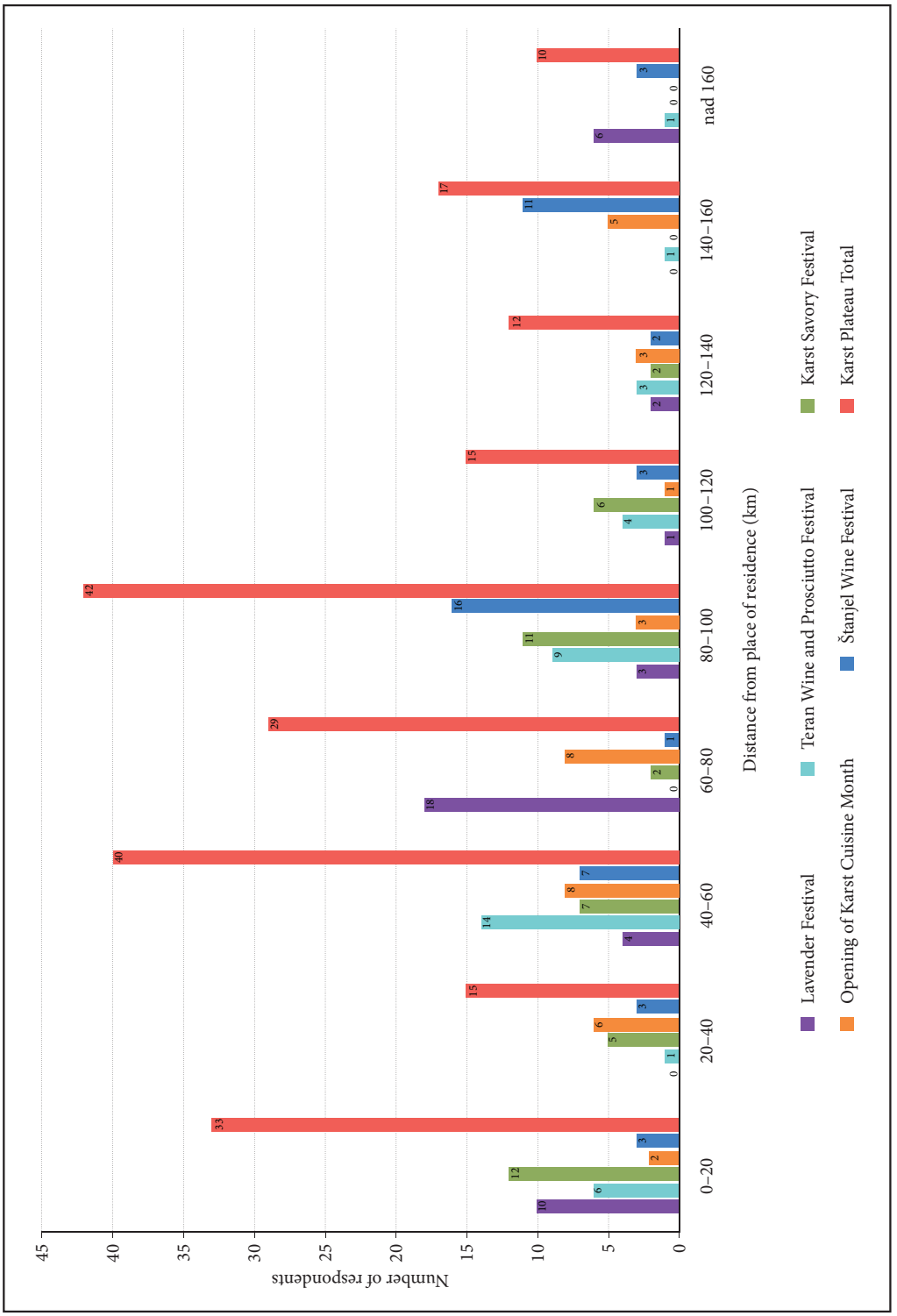
Respondents were most satisfied with restroom cleanliness at the Štanjel Wine Festival and Karst Savory Festival, whereas they were the least satisfied with restroom cleanliness at the Teran Wine and Prosciutto Festival.

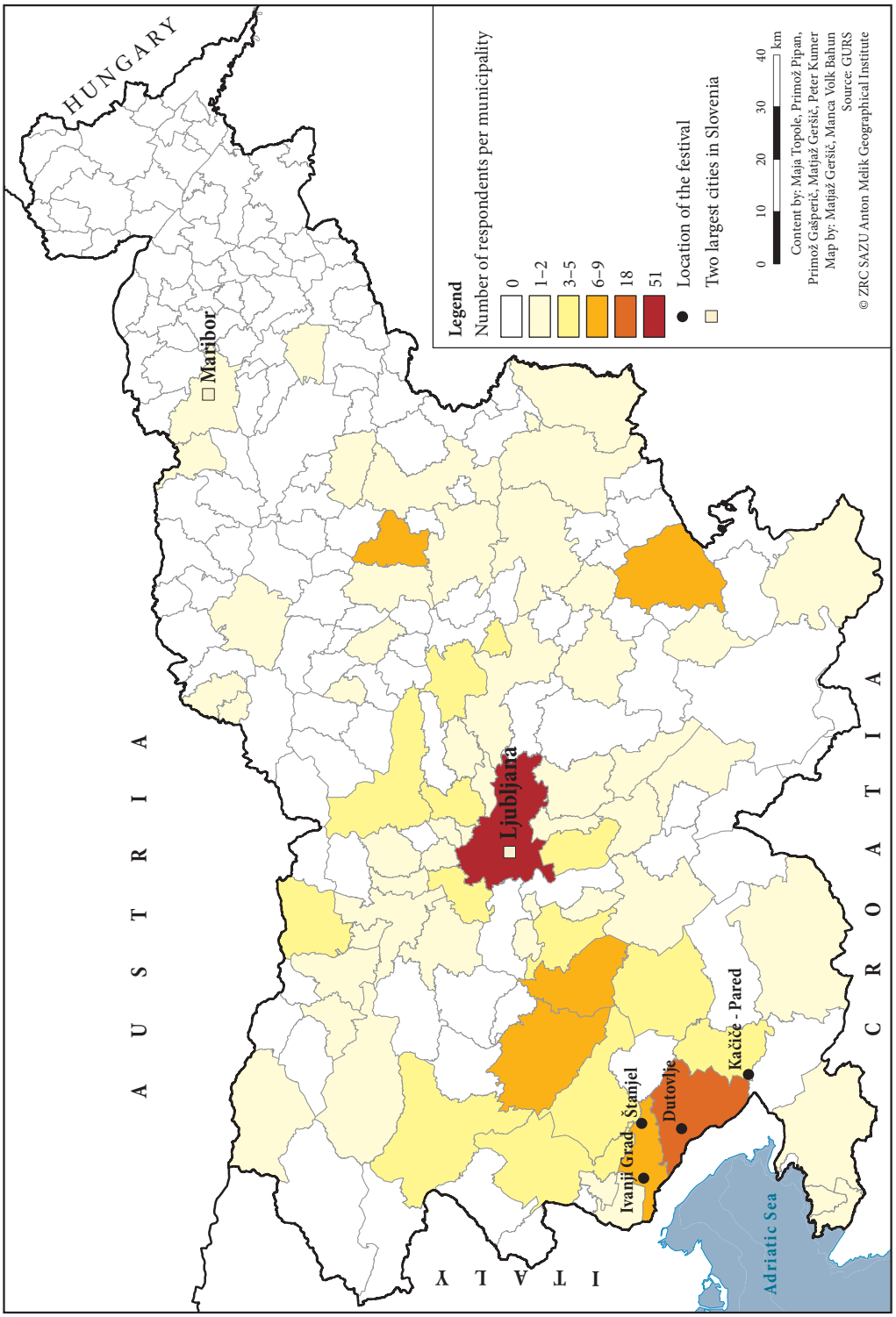
All the organizers were ranked relatively low in terms of free drinking water provision. The organizers of the Štanjel Wine Festival and Karst Savory Festival scored highest in supplying free drinking water (such as at fountains) and marking them clearly.

3.4 Visitor structure and place of residence

The group between forty-six and sixty years old predominated among the respondents (39%), and those under thirty accounted for the smallest share (14%). An above-average share of respondents sixty-one or older (i.e., 28%) was recorded at the Karst Savory Festival and of those under thirty at the Štanjel Wine Festival (22%). Most of the respondents (almost 50%) in all events have a university education, followed by a secondary education (29%). The highest share of university-educated respondents participated in the Opening of Karst Cuisine Month (64%). Some respondents (31) refused to disclose information on their education, age, and place of residence. In general, respondents from places that are not very far away and allow them to make a one-day trip predominated. The majority (i.e., 80%) came from places over 50 km away, and 41% even came from places over 100 km away. They are willing to travel that far to explore a less familiar culture or a less familiar or unknown region (Figure 5, Figure 6).

Figure 5: Distance between culinary events on the Karst Plateau and respondents' place of residence (n = 213). ► p. 118
Figure 6: Municipalities that respondents to culinary events on the Karst Plateau came from (n = 213). ► p. 119


Number of respondents
0
5
10
15
20
25
30
35
40
45
Distance from place of residence (km)
0–20
20–40
40–60
60–80
80–100
100–120
120–140
140–160
nad 160
Lavender Festival
Teran Wine and Prosciutto Festival
Karst Savory Festival
Opening of Karst Cuisine Month
Štanjel Wine Festival
Karst Plateau Total


HUNGARY
Maribor
Ljubljana
Ivanji Grad
Štanjel
Dutovlje
Kačiče - Pared
Adriatic Sea
A U S T R I A
I T A L Y
C R O A T I A
Legend
Number of respondents per municipality
0
1–2
3–5
6–9
18
51
Location of the festival
Two largest cities in Slovenia
0 10 20 30 40 km
Content by: Maja Topole, Primož Pipan, Primož Gašperič, Matjaž Geršič, Peter Kumer
Map by: Matjaž Geršič, Manca Volk Bahun
Source: GURS
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4 Discussion

4.1 Main motives: local cuisine, expecting something new, cultural heritage

Most respondents (58%) attend events that are thematically very diverse, with food not being the only reason for attending. Getz et al. (2015) and Yuan et al. (2005) came to similar conclusions.

Crompton and McKay (1997) and Nicholson and Pearce (2001) state that, compared to other non-food events, attendees of food-related events are less interested in cultural exploration, but our results show that interest in cultural content is among the three most important motives for attending a culinary event, especially for those from faraway places. These people have a stronger desire to experience something new and unusual, and they wish to avoid the everyday routine. More opportunities for this are provided at boutique culinary events.

Most respondents do not wish to be more actively involved in food preparation; they simply want more tasting and training in the form of workshops. Similar was established by Çela, Knowles-Lankford, and Lankford (2007), Park, Reisinger, and Kang (2008), and Hattingh and Swart (2016).

According to Getz et al. (2015), entertainment and socializing are among the predominant motives. In this case, however, only 4% of respondents expressly mentioned socializing as a motive, even though most came to the event with their partner, with other couples, with their family, or in a large organized group (e.g., as a society). Cuisine and socializing are largely more important motives, especially for those that come from places nearby, up to only 20 km away. The share of these was only 15%, and for them other motives are less relevant. In contrast, motives such as experiencing something special or exploring cultural heritage are important for those that come from far away and are unfamiliar with the target area. More demanding and satisfied visitors like to return, and for them it is improving knowledge about food and wine that counts. The findings by Park, Reisinger, and Kang (2008) thus also apply to the Karst Plateau. This is particularly valid for specialized culinary events like the Karst Savory Festival. The factors of education status of the participants are considered one of the most important. Participants with at least a university education (almost 50%), and from higher-income social groups prevail at the gastronomic events. It appears that people are willing to travel longer distances to participate in an event (Krajíčková and Šauer 2018). More than half (56%) reported that they would also be willing to stay overnight in the area; this applies to culinary events in general. Especially visitors from places farther away are willing to pay more for high-quality food or improved programs, food preparation, and organization, which agrees with Leones, Colby and Crandall (1998) that people traveling farther spend more at the destination to justify the travel expenses. We cannot confirm this because the respondents were not asked about their income or how much they spent at the event.

It is vital for event organizers to know in detail the motives that attract visitors. Only in this way can they meet their expectations about the selection of food and drinks offered, their diversity, authenticity, quality, and how they are served, and about a fair and friendly attitude. Considering that only 9% of respondents attended the event only for the cuisine and that others need additional motives to attend culinary events, the accompanying program must also be prepared with great care: a cultural program, a presentation of the place or area, activities typical of the region, products offered at stands, and a sports program. Other authors (Weiler, Truong and Griffiths 2004; Park, Reislinger and Kang 2008; Smith, Costello and Muenchen 2010; Getz et al. 2015; Hattingh and Swart 2016) also established that, in addition to visitors interested in food, culinary festivals are also attended by many other people with completely non-culinary motives.

4.2 Visitor satisfaction is influenced by more than just the selection of food and drinks

Food contributes significantly to tourist satisfaction, and hence tourism should be connected with gastronomy (Ab Karim and Chi 2010; Jiménez Beltrán, López-Guzmán and Santa-Cruz 2016). The culinary events studied on the Karst Plateau prove this because most respondents came to the event due to its culinary theme (Figure 1). However, only 9% reported that cuisine was the only reason for attending. Others required additional motives (Figure 2).

The respondents confirmed the findings of Nield, Kozak, and LeGrys (2000) and Fox (2007) that local gastronomy, the quality and price of food, and ambiance influence tourist satisfaction the most. Because consumer satisfaction is very important (Morgan, Attaway and Griffin 1996; McQuitty, Finn and Wiley

2000) and affects marketing (Erevelles and Leavitt 1992), the organization of culinary events on the Karst Plateau should take into account that more demanding visitors seek a more diverse selection of local (home-made) food and more opportunities for tasting traditional dishes and dishes prepared in new, innovative ways. In addition to ambiance, they are also interested in a high-quality complete cultural program originating in Karst tradition. This requires the following from the event organizers: good technical organization and sustainable behavior, successful connection and coordination of stakeholders, and good managerial skills of their leader (Šmid Hribar, Razpotnik Visković and Bole 2021). Visitor satisfaction is enhanced by sufficient signs showing the way to the venue, carefully planned traffic and people coordinating parking, appropriate distance and arrangement of parking areas and access points, info points with helpful staff, information signs with a schedule of activities or regular loudspeaker announcements, well-arranged stands, marked and clean restrooms, marked waste bins, proper waste management and instructions for recycling, clean public transport stops, and availability of public transport. Satisfaction is further influenced by the use of environmentally friendly packaging, accessibility of drinking water (not in plastic bottles), and first aid availability.

All the events on the Karst Plateau take place outdoors, and so one of their weaknesses is poor adaptation to bad weather. Bad weather influences the quality of the services and products offered, and the general atmosphere, and results in a critical opinion among visitors and a smaller number of providers and visitors. Therefore, even more thorough preparations for potential rainy weather are required.

4.3 Certain sustainability aspects are still insufficiently observed

Some Karst events still have room for improvement in sustainable behavior. In general, respondents ranked the selection of food and drinks relatively high (3.9 out of 5), but one-third nonetheless felt greater diversity of local and especially home-made food and drinks was missing, including stews and soups. The more critical among them were aware that there is primarily a need to present the local environment and local products and intangible qualities that are key for promoting the region. Among other things, they highlighted that dishes from elsewhere, such as Bled cream pastry (*blejska kremna rezina*, *kremšnita*), Balkan rolled kebabs (*čevapčiči*), and so on are completely unnecessary in the selection of Karst food presented. The same applies to the selection of handicrafts offered at stands and the accompanying program. The emphasis should be on the Karst tradition. The range of products offered should be better connected with the event's theme, which should present the local traditional crafts and cuisine.

A weakness of tourism on the Karst Plateau is the poor public transport accessibility of the event venues. As many as 83% of respondents came to the events studied by car. An example of a better practice in this regard is the Štanjel Wine Festival, where train service from Ljubljana was offered in combination with a circular bus route. In this connection the revival of the Karst railway, which was discontinued after the Second World War, may be worth considering. Event organizers strive to introduce ecological improvements, but these are still insufficient; the use, selection, and availability of sustainable packaging materials received a score of only 3.3 out of 5, and recycling was only rated 3.4 out of 5.

4.4 Limitations of the study

Most respondents lacked extensive experience in attending culinary events. Two-thirds revealed their favorite culinary experience up until then, a few individuals did not remember anything that would be worth mentioning, and 7% did not have a previous culinary experience because that was the first time they had attended a culinary event. Those with more experience (41%) mentioned a variety of culinary events across the globe, including elsewhere in Europe and Slovenia (e.g., street food in Tokyo or Sri Lanka, a restaurant in Paris, outdoor food service in Heiligenblut, Austria, and so on). The only thing that came up several times was the *Odprta kuhna* food market in various Slovenian towns (6%), but this was only mentioned by respondents with less culinary experience. The Karst Plateau Lavender Festival was included in the survey because cuisine was expected to play a major role in this event, but it later turned out that other aspects were more important. The programs offered at the Teran Wine and Prosciutto Festival and the Opening of Karst Cuisine Month were partly compromised by rain. The results of surveys conducted with visitors of large-scale culinary events on the one hand and boutique events on the other are difficult to compare because respondents have different criteria. In general, participants in boutique events are more demanding and have stricter criteria.

5 Conclusion

This paper presents the findings of an analysis of 244 people surveyed at five culinary events on the Slovenian Karst Plateau during the summer of 2018. Local cuisine is a very important motive that draws people to these events, which provide an opportunity to promote the region and its cultural heritage.

Only 9% of respondents stated that cuisine was the only motive for attending the culinary event. For just under one-third, cuisine is the most important reason, but they need additional stimulation. For 56% of respondents, cuisine is a welcome addition, but not a primary motive for attending. The most important motives for attending culinary events include the following: local cuisine, experiencing something new, different, and special, and exploring natural and, first and foremost, cultural heritage. Cuisine and socializing are important for only 15% of respondents, who tend to come from nearby places, only up to 20 km away.

Respondent satisfaction is the greatest at boutique culinary events, where the main theme is highlighted more than at large-scale culinary events. More demanding visitors (almost 50% of respondents had a university degree) seek a greater diversity of local sustainably produced food and more opportunities for tasting traditional dishes and dishes prepared and served in a different, innovative way. They are also interested in a combination of cuisine and local culture (e.g., dance, music, and presentation of the place).

The visitors also evaluated the events in terms of sustainability. The main weakness highlighted was the poor public transport accessibility of the venues. They also think there is still significant room for improvement in selecting the packaging used; plastic disposable packaging still tends to be overused at these events.

The success of promoting a specific region and expanding the area it draws visitors from primarily depends on the quality of services and food ingredients, the uniqueness of culinary events, and experiences that cannot be expected anywhere else.

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MODELS OF STAKEHOLDER COLLABORATION IN FOOD TOURISM EXPERIENCES

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TOMO JESENIČNIK

Food is an essential part of every tourism experience.

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Models of stakeholder collaboration in food tourism experiences

ABSTRACT: This study explores the role of stakeholders in creating and managing food tourism experiences. The main aim was to discover who participates in this process, why, and how. The research is based on interviews and participatory observation of twenty-two case studies mainly located in rural areas in eight Mediterranean countries. The paper focuses on two types of food experience: food events and food services with additional subtypes. The results reveal three models of stakeholder collaboration: one typical for events, one typical for services, and one emphasizing more direct interaction between visitors and local communities. The findings show diversity in the connections among stakeholders, who have different motives and roles in food experiences.

KEY WORDS: food tourism, gastronomy tourism, tourism experience, stakeholders, network, collaboration, Mediterranean

Modeli sodelovanj deležnikov v kulinarični turistični izkušnji

POVZETEK: Študija raziskuje vlogo deležnikov pri ustvarjanju in upravljanju kulinaričnih turističnih izkušenj. Glavni cilj je bil odkriti kdo, zakaj in kako sodeluje v tem procesu. Raziskave temeljijo na intervjujih in opazovanju z udeležbo v 22 študijskih primerih v pretežno podeželskih območjih v osmih sredozemskih državah. Osredotočili smo se na dve vrsti izkušenj: kulinarične prireditve in kulinarične storitve z njihovimi dodatnimi podtipi. Naši rezultati kažejo na tri modele sodelovanja deležnikov: enega, značilnega za dogodke, drugega za storitve in tretjega, ki poudarja bolj neposreden stik med obiskovalci ter lokalno skupnostjo. Ugotovitve kažejo raznolikost povezav med deležniki, ki imajo različne motive in nastopajo v različnih vlogah.

KLJUČNE BESEDE: kulinarični turizem, gastronomski turizem, turistična izkušnja, deležniki, mreža, sodelovanje, Sredozemlje

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1 Introduction

Culinary tourism, *food tourism*, and *gastronomy tourism* are interchangeable terms associating food and tourism. The term *culinary tourism* is favored in North America, *food tourism* in Australia and Asia, and *gastronomy tourism* in Europe, although it seems that international organizations such as the World Food Travel Organization or the World Tourism Organization (hereafter: UNWTO) seem to prefer *food tourism* because the terms *culinary tourism* or *gastronomy tourism* have an »elitist ring« (Rachão et al. 2019, 35). This paper also uses the term *food tourism*.

Although food is an essential part of every tourism experience, studies and typologies are difficult to come by. In a special report (OCTA & Skift 2015, 4) food tourism is characterized as »any tourism experience in which one learns about, appreciates, and/or consumes food and drink that reflects the local, regional or national cuisine, heritage and culture.« The UNWTO has adopted the definition by Hall and Mitchell (2001), which identified the following activities of food tourism attracting visitors: primary and secondary food producers, food festivals, restaurants and specific locations for food tastings, and experiencing specialist food production. This definition implies that food tourism involves many different stakeholders with different motives and roles in entrepreneurial food networks (Boesen, Sundbo and Sundbo 2016).

This paper explores the role of stakeholders in creating and managing food tourism experiences: who participates in this process, why, and how. It investigates food tourism experiences in the Mediterranean area and addresses the following research questions:

- Do different types of food experiences stimulate the creation of various stakeholder networks? Who are the stakeholders collaborating within food experiences, and what is their role in a specific type?
- Which motives drive stakeholders to connect and set up a new food experience? What are the strengths and potential threats in their collaboration?

The objective of this paper is thus to identify stakeholders involved in different types of food experience, identify their motives for cooperation, and explore their role in the network.

2 Background

Rural areas are well-positioned for cultural and food tourism. In addition to distinct cultural and social capital, they combine natural environments suited for tourism opportunities (Bole, Šmid Hribar and Pipan 2017). Food tourism in rural areas is increasingly being marketed with the goal of »reconnecting« with nature, resilience to globalization, a search for authenticity, freshness, and support for local producers and local products (Sidali, Kastenholz and Bianchi 2015; Ledinek Lozej 2020, 2021). In a way, food has become an ideal endogenous resource of rural territorial development, in which the knowledge of local gastronomy is either rediscovered or newly invented for economic gain or social wellbeing (Ray 1998).

Food has become an attraction in its own right and a motivation for travel. Food tourism also depends on consumers' socioeconomic characteristics, especially their educational profile and age group (Vuksanović et al. 2019). Hall and Sharples (2003) state that a visit to a restaurant is not food tourism in itself, but the desire to experience a particular type of food or the produce of a specific region, or to taste dishes prepared by a particular chef, could be motives for such travel. There is no definite typology of food tourism experiences; however, Smith and Xiao (2008) present a typology of food tourism resources, which could serve in understanding the variety of tourism experiences based on them (Table 1). They are divided into four groups: facilities, events, activities, and organizations. Certain resources fit better into a more experience-based economic model.

In general, one can distinguish between three types, or »generations,« of research on food tourism experiences (Richards 2015). The first generation is where the main topic was how to engage consumers by designing experience elements to make tourism products that engage all five senses. The second generation of research is marked by the emergence of the »foodie« – a conscious and experienced consumer, driven by a search for »authentic« and »exotic« culinary experiences. In the third generation of research, the tourist is seen as a co-creator of culinary experience with direct interaction between the consumer and the residents (cooking classes at home, tours at food markets with local producers, etc.). This also requires great interconnectedness of local producers; in this vein, Richards (2015) advocates a more experience- and network-based approach instead of the atomized view of tourism gastronomy.

Another attempt to classify food tourism was provided by Bessière (2013), who linked gastronomy to heritage. According to her, gastronomy heritage is understood as collective memory and a cultural code connected with particular production and food modes, rooted in a territory, space, and time. Bessière distinguished three basic forms of gastronomy heritage. The first is the traditional or artisanal form, in which stakeholders aim to conserve or preserve traditional heritage and have a strong territorial attachment. Second is the industrial form of gastronomy heritage promotion, in which heritage is promoted by one iconic or dominant production, such as a type of cheese or other products. The third form is heritage promoted around rural enterprises, in which new innovative tourist activities are centered on local producers and their farming activities.

How different stakeholders are engaged in the creation of food experience can be understood through the supply chain theory, which »refers to the body of concepts, models, and relationships describing the linkages of producers and distributors in the context of the creation of a commodity« (Smith and Xiao 2008, 291). According to Atkin and Affonso (2004), each stakeholder enters the initiative with its level of contribution (high or low), level of risk (high or low), and level of expectations regarding the profit (high or low, and short- or long-term). Different expectations lead to more difficult management of the food experience and require a more skilled leader to manage potential conflict situations. Boesen, Sundbo, and Sundbo (2016) argue that the success of the collaborations within a network depends strongly on the action and attitude logics of actors, depending on their motivation to join the initiative.

Actors' actions are determined by either one logic or several logics in which one is dominant (Thornton and Ocasio 2008; Cloutier and Langley 2013). According to Boesen, Sundbo and Sundbo (2016; Table 2), it is not unusual for actors to follow different logics in different situations (networks or cooperation initiatives) or to change their perspective at different stages of cooperation, especially in challenging situations such as resolving disagreements. If network members are able to adjust and shift between different logics, the initiative is easier to manage (Boesen, Sundbo and Sundbo 2016). If the pluralism of logic is too obvious and there is a lack of dynamism in actors' behavior (willingness to compromise), initiatives need to undergo significant organizational changes or they fall apart. The success of the food experience thus depends significantly on the compatibility of the actor's motives because this determines their ability to positively collaborate within the network (Mei, Lerfald and Brata 2017).

Finally, it must be stressed that the stakeholders' motives for collaboration in creating food experiences are not only economic in nature. In cases of other tourism activities, the main motivation for stakeholders'

Table 1: Food tourism resources and products (adapted from Smith and Xiao 2008).

Facilities	Activities	Events	Organizations
• Buildings/structures: food-processing facilities, wineries, breweries, farmers' markets, stores, museums, restaurants • Land uses: farms, orchards, vineyards, food streets • Routes: wine routes, food routes, gourmet trails	• Consumption: dining, picnics, food purchase, pick-your-own operations • Touring: wine, agricultural regions, city food districts • Education/observation: cooking classes, wine tastings, chef competitions, reading food magazines and books	• Consumer shows: food and wine shows, kitchen shows, product launches • Festivals: food or wine festivals, harvest festivals	• Restaurant classifications or certifications (Michelin, etc.), food/wine classifications and associations (slow food, etc.)

Table 2: Overview of action and attitude logics and their components (Boltanski and Thevenot 1999; Boesen, Sundbo and Sundbo 2016).

Logic	Higher common principle and motives	Worth attributes
Inspired	Creativity, ingenuity, nonconformity	Passionate, spontaneous
Domestic	Reputation, authority, hierarchy	Discreet, trustworthy, honest
Civic	Collective interest, solidarity, equality	Unitary, official
Opinion	Recognition, renown	Reputed, visible
Market	Price, purchasing power	Desirable, value
Industrial	Productivity, efficiency, expertise	Functional, reliable

collaboration is in local community-building, personal empowerment, and assuming responsibility for their own (local) development (Bole, Pipan and Komac 2013). In those cases, stakeholders go beyond only economic competitiveness and collaborate to pursue common principles and motives as well (Šmid Hribar and Ledinek Lozej 2013).

3 Methods

This study analyzed twenty-two food experiences (Figure 1), mainly located in rural areas in eight Mediterranean countries. Sixteen cases were set up before the MEDFEST project (MEDFEST – MED culinary heritage experiences: How to create sustainable tourist destinations) in 2017, and six of them were newly created as a result of the same project during 2018 and 2019.

3.1 Existing food tourism experiences

In selecting the sixteen food experiences for this study, the availability of data and accessibility of stakeholders for interviews were considered. The goal was to identify diverse types of food experiences (see 3.3; Capatti 2012; Richards 2012; Kumer et al. 2019) in eight Mediterranean countries (Croatia, Cyprus, France, Greece, Italy, Portugal, Slovenia, and Spain). For each selected experience, four to eight in-depth interviews were conducted with organizers and other involved stakeholders (farmers, local tourism authorities, representatives of associations, and others). The questionnaire was structured in such a way as to collect data about the content of the culinary experience, territorial anchoring of the experience, organization of the stakeholders, and inclusion of experience in existing policies and strategies. Interviews were carried out between June and August 2017, and they were written into stories by the project partners (Kumer, Šmid Hribar and Razpotnik Visković 2018).

3.2 New food tourism experiences

Six food experiences in this study are new ones. They were created in 2018 and 2019 as part of the MEDFEST project. The process has been followed from the beginning, gathering information about the content of the experience and tracking the involvement of the stakeholders.

3.3 Typology of food tourism experiences

For the content analysis of food experiences, which tried to establish distinct types of food experiences, the following typology was used:

- Events related to food:
  - Single-activity events (usually focused on one specific theme and one place);
  - Combined-activity events (a broader theme, various locations and multiple places in a wider region, throughout the year or season).
- Services related to food:
  - Place-based services (linked to one location; e.g., a kitchen for workshops);
  - Tours (linked to several locations organized in an integrated activity).

3.4 Content analysis and models

Content analysis of food experiences was performed based on interviews, study visits, and detailed project reports. The following information indicating the main characteristics of the food experiences was obtained: inclusion of the stakeholders and the main holder(s), their motives and roles in the network, approaches taken, and type of financial support. The term holder refers to the institution, association, entrepreneur, network, or other entity that organizes a food tourism experience, and can be public, private or mixed when there are more than one holder involved. Based on collected data for previous and new food

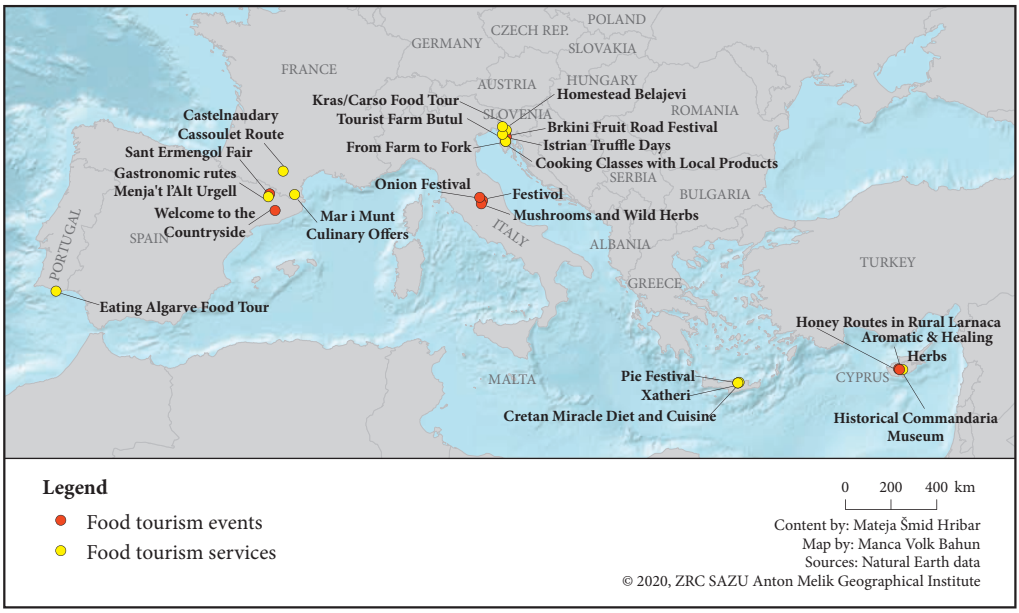


Figure 1: Locations of food tourism experiences in eight Mediterranean countries explored in this paper.

experiences, an overview table of twenty-two food experiences was created (Table 3) as well as a matrix of stakeholders' roles and networks (Figure 2).

In addition, the models of stakeholder networks were created with a classification of experiences based on who the holder of the experience is and who participates (which group of stakeholders), what the main actions are in creating the experience, and what their role is in the experience.

4 Results

4.1 Types of food tourism experiences and stakeholders involved

The food tourism experiences analyzed (hereafter: experiences) can mainly be divided into two main and distinguishing types, which can be further subdivided into two subtypes. Of the twenty-two experiences, almost half (10; 45%) are food events, which were divided into events with single activities (6; 27%) and events with combined activities (4; 18%). The remaining experiences (12; 55%) were classified as food-related services; seven of them (32%) fit into place-based services, and five (23%) exist as tours. Sixteen experiences were created earlier, and six were set up during the project, which made it possible to gain insight into their creation. All the latter experiences received start-up investments. In the older experiences, the food events observed depend on longer financial support and are all financed by public authorities (see Table 3 and Figure 2). On the other hand, all but one of the food services (the *Castelnaudary Cassoulet Route*) received start-up investment, but they can continue with their financial resources. Half of the creators of food services invested their own resources.

Interestingly, the majority of events (8; 80%) are managed by more than one holder usually two to three public or public and private institutions are involved in a top-down approach. Exceptions are the event *Sant Ermengol Fair*, where the initiative came from a citizen, but was later led by the municipality and therefore classified as a »mixed approach,« and the *Onion Festival*, which was initiated and led by a local association. In contrast, most of the services (9; 75%) are managed by a single, often private holder using a bottom-up approach.

Table 3: Food experiences by country, year of establishment, type and number of holders, type of financial support, and approach.

Type, number	Name	Country	Established	Type and number of holder	Financial support	Approach
Events (10)						
Single activity (6)	Aromatic & Healing Herbs	Cyprus	2008	Mixed (3)	Longer/ongoing	Top-down
	Festivol	Italy	2006	Mixed (2)	Longer/ongoing	Top-down
	Sant Ermengol Fair	Spain	1995	Public (1)	Longer/ongoing	Mixed
	Mushrooms and Wild Herbs*	Italy	1994†	Mixed (2)	Longer/ongoing	Top-down
	Onion Festival	Italy	1981	Mixed (3)	Longer/ongoing	Bottom-up
	Pie Festival	Greece	2012	Private (1)	Longer/ongoing	Top-down
Combined activities (4)	Welcome to the Countryside	Spain	2016	Public (2)	Longer/ongoing	Top-down
	Brkini Fruit Road Festival	Slovenia	2015	Mixed (6)	Longer/ongoing	Top-down
	Honey Routes in Rural Larnaca*	Cyprus	2014	Mixed (2)	Startup investments	Top-down
	Istrian Truffle Days	Croatia	1994	Public (3)	Longer/ongoing	Top-down
Services (12)						
Place-based (7)	Cooking Classes with Local Products	Croatia	2015	Public (1)	Startup investments	Top-down
	Cretan Miracle Diet and Cuisine	Greece	2013	Private (1)	No public support	Bottom-up
	From Farm to Fork*	Croatia	2019	Public (1)	Startup investments	Top-down
	Historical Commandaria Museum	Cyprus	2010	Mixed (2)	Startup investments	Bottom-up
	Homestead Belajevi	Slovenia	2013	Private (1)	Startup investments	Bottom-up
	Tourist Farm Butul	Slovenia	1997	Private (1)	Startup investments	Bottom-up
	Xatheri	Greece	2014	Private (1)	Startup investments	Bottom-up
Tour (5)	Castelnaudary Cassoulet Route	France	2007	Public (2)	Longer/ongoing	Top-down
	Eating Algarve Food Tour	Portugal	2016	Private (1)	Startup investments	Bottom-up
	Kras/Carso Food Tour*	Slovenia	2019	Private (1)	Startup investments	Bottom-up
	Mar i Munt Culinary offers*	France	2019	Public (2)	Startup investments	Top-down
	Gastronomy Routes Menja't l'Alt Urgell*	Spain	2019	Private (1)	Startup investments	Bottom-up

* Experiences developed within the MEDFEST project
† first developed in 1994, improved in 2018

The main stakeholders involved in Mediterranean food experiences are public institutions, food producers, and private holders of food experiences. In-depth interviews showed that tourism and rural development agencies as part of public authorities are the driving force in the creation of food events, and that entrepreneurs, who are not necessarily farmers, play a significant role in the creation of food services. However, many other stakeholders are involved in the creation and organization of food experiences. They have different motives and roles: they organize, manage, finance, promote, or only participate with their services or products. The following stakeholders were identified (Figure 2):

- **Public bodies** are usually concerned with government, tourism, or development and are active at the local, regional, or national level (e.g., the local council, municipality, tourism organization, or regional development agency); their role is particularly crucial at food events, where they provide funding and publicity and are often the first initiator of the event.
- **Local agricultural producers** either act individually or are organized in associations and cooperatives (e.g., farmers, bean producers, cheese makers, winemakers, beekeepers, fishermen, herb farmers, duck farmers, etc.). They supply the main ingredients and food-related products, and sometimes they initiate and finance food events.
- **Private food tourism experience creators** are entrepreneurs (sometimes a family) or associations, sometimes with a professional background in gastronomy or cultural heritage, but this is not necessary. They are central to the food services they create but are also often involved in food events.
- **Supporting experts and professionals** (e.g., chefs, nutrition experts, brand makers, travel guides, or text writers) are essential because they often add a special value to individual experiences to make them more attractive.
- **Local private companies, small shops, restaurants, and hotels** (e.g., dairies, truffle businesses, canneries, etc.) offer products and additional services; in rare cases they also finance food experiences.
- **Tour operators and travel agencies** are particularly involved in providing services in less accessible areas.
- **The research sector and schools** are crucial for the transfer of knowledge, learning, and development.
- **Various chambers** (e.g., chambers of commerce, trades, crafts, and agriculture) are also involved.
- **Other stakeholders** involved include artists, active citizens, the press, protected areas, and museums.

Three models of stakeholder networking were identified and defined (Figure 3). In Model 1, one or more public institutions that are already linked to each other and already acting as a driving force for development choose a topic that is significant for the area, and they achieve a common vision for organization a food event. In later stages, they invite other stakeholders to participate, thereby expanding the network.

In contrast, the model for services (Model 2) involves an entrepreneur creating an experience and making unique agreements with stakeholders that offer products or services. Key services could be based on the entrepreneurs' knowledge, products, or location, or they might outsource to external stakeholders.

The analysis revealed another approach to creating food services, which is represented in Model 3. In this case, it is an existing group of private food experience creators and/or local food producers and accommodation providers that start creating new food services based on their previous collaboration and mutual trust. Based on the search for synergies among themselves, they create a range of food services arranged in different tourism activities. They might invite other national and international stakeholders to collaborate, but they tend to be less open than the private entrepreneurs in Model 2.

Because the private creators of the food experience in Models 2 and 3 invest their own resources, it is of great importance whether they can obtain additional funds for advertising and joint marketing, often provided by public authorities.

4.2 Motivation behind different types of food experiences

The motives for launching the food experience were explained by the holders during interviews; they explained how the food experience began and how a stakeholder network was built around it. The motives were thus identified at the level of the food experience and not for each participating stakeholder, where differences might occur.

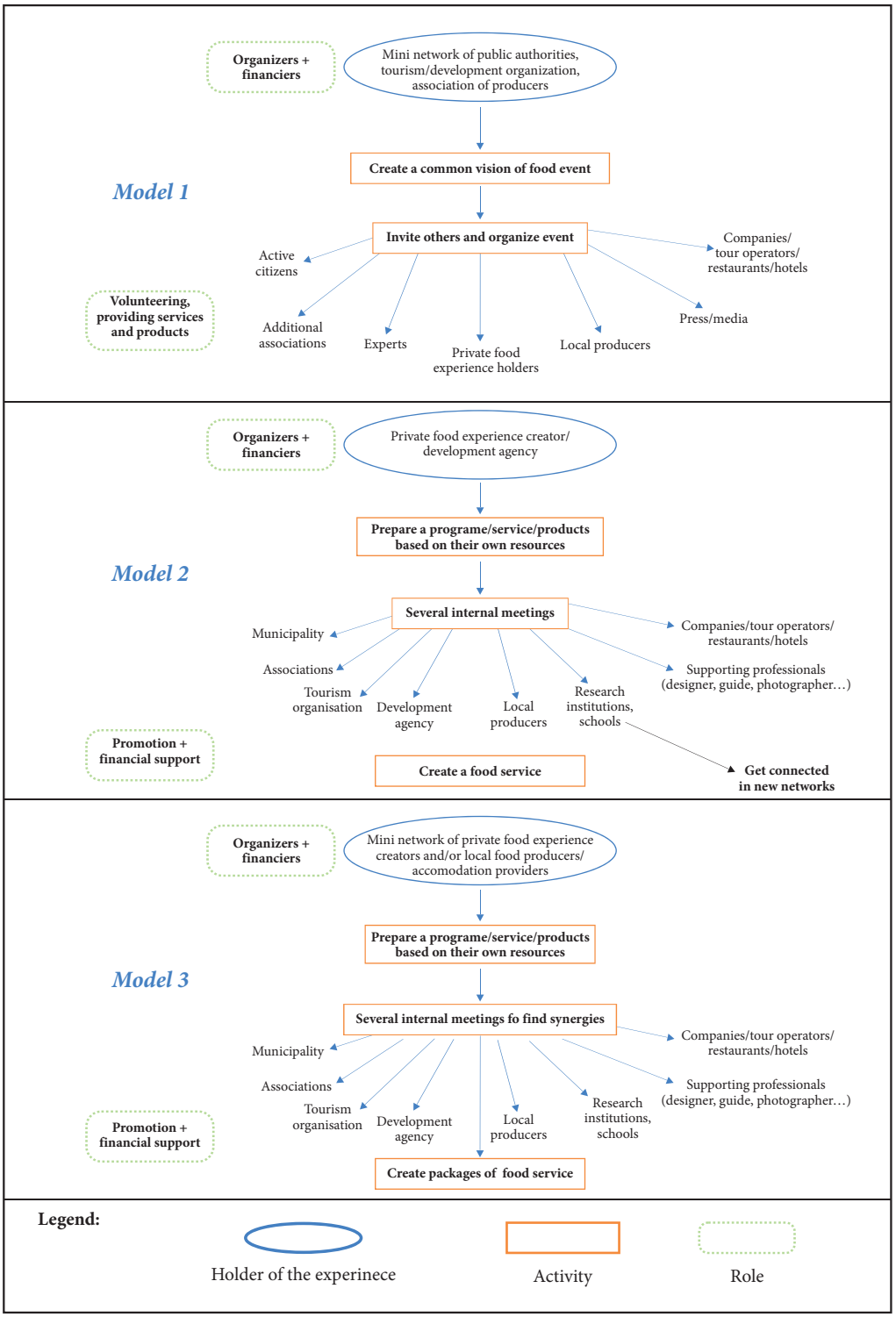
The motives of different stakeholders may vary depending on the nature of the food experience and the related network, which means that the same stakeholders play different roles and have different

motives in different food experiences (Figure 4). The most common identified motive for initiating food experiences by public authorities or tourism organizations is to increase the visibility of the tourist destinations, to safeguard heritage, to create networks with links between service providers and local producers, and to prolong tourist activities into the off-season period. Networking enables them to offer a common narrative and contribute to the diversification of tourist products and development of regional tourist services. The main motivation for an association of local producers or cooperatives to hold a food event is to participate in the effective promotion and wide recognition of a specific local product, diet, or culture. In the case of private entrepreneurs, direct economic benefit is the main motive, but not the only one. Through stories created around food experiences, many private holders educate visitors about the importance and valorization of food resources as stated by Topole et al. (2021). Promotion and wider recognition are also crucial aspects for them, and so it is important to include them in preexisting websites, leaflets, and joint market presentations supported by tourism organizations and public authorities.

Types of food experience	Name of food experience	STAKEHOLDERS	regional/national authority	munipal/local authority	local tourism organisation	regional tourism organisation	national tourism organisation	regional development agency	local development agency	association of local	cultural and other association	local producers	local women/women association	artist/musicians	experts/professionals	tour operators/travel agents	private culinary experience creator	regional institute for agriculture and forestry	school/university/R&D	private company/service providers	local restaurants/caterers	local hotels/tourist farms/business	active citizens	Chambers	existing partnership/network	press/TV channel	protected area/museums
Legend	Initiator																										
	Organizer																										
	Participator																										
	F financial support																										
EVENTS																											
single activity	Aromatic & Healing Herbs		+	F +		+	F +					+	+		+	+							+		+		
	Festivol			F+				F	+	+					+								+		+		
	Fira de Sant Ermengol		F+	+						+		+			+				+	F+	+	+					
	*Mushrooms and wild herbs			F+					+	+		+				+				+	+						
	Onion Festival		+	F+					+	+		+		+									+	+	F+		
	Pie Festival			F+							+		+														
combined activities	Benvinguts a Pagès		F+			+				+		+							+		+	+					
	Brkini Fruit Road Festival			F+	+				+	+		+						+		+	+	+		+			
	*Honey routes in rural Larnaca			+		+				+		+	+		+	+			+	+	+	+			F+	+	
	Istrian truffle days		F+	+	F+	F				+		+		+						+	+						
SERVICES																											
place-based	Cooking classes with local products				F+			F+				+			+									F+			
	Cretan Miracle Diet and Cuisine			+								+				+	F +		+			+					
	*From farm to fork		+		+	+		F+			+	+			+	+				+	+	+		+			
	Historical Commandaria Museum			F+			+			+		+	+		+												
	Homestead Belajevi			+						+		+					F +	+		+							
	Tourist Farm Butul			+	+							+					F +		+			+					+
	Xatheri									+		+		+	+		F +		+	+							
route	Castelnaudary Cassoulet Route			+	+	F+						+		+							+						
	Eating Algarve Food tour			+	+						+	+			+	+				F+	+	+	+			+	+
	*Kras Carso Food Tour			+	+						F+	+			+				F+								
	*Mar i munt culinary offers		+	+	+						+	+				+			F +	+	+						
	*Rutes gastronòm. menja't l'alt Urgell		+	F+					+	+	+	+			+	+			F +	+	+						

Figure 2: Stakeholders involved in creating, financing, and organizing selected food tourism experiences.

Figure 3: Models of stakeholder networks. ► p. 136


Model 1
Organizers + financiers
Mini network of public authorities, tourism/development organization, association of producers
Create a common vision of food event
Invite others and organize event
Active citizens
Companies/ tour operators/ restaurants/hotels
Press/media
Volunteering, providing services and products
Additional associations
Experts
Private food experience holders
Local producers
Model 2
Organizers + financiers
Private food experience creator/ development agency
Prepare a programe/service/products based on their own resources
Several internal meetings
Municipality
Companies/tour operators/ restaurants/hotels
Associations
Supporting professionals (designer, guide, photographer…)
Tourism organisation
Development agency
Local producers
Research institutions, schools
Promotion + financial support
Create a food service
Get connected in new networks
Model 3
Organizers + financiers
Mini network of private food experience creators and/or local food producers/ accomodation providers
Prepare a programe/service/products based on their own resources
Several internal meetings fo find synergies
Municipality
Companies/tour operators/ restaurants/hotels
Associations
Supporting professionals (designer, guide, photographer…)
Tourism organisation
Development agency
Local producers
Research institutions, schools
Promotion + financial support
Create packages of food service
Legend:
Holder of the experinece
Activity
Role

5 Discussion

The investigation of the selected cases of food tourism experiences revealed that they were created for different purposes, by different initiators, and for different target groups. The study identified two significantly different types with four subtypes. This typology can be closely related to the three generations of food tourism experiences presented by Richards (2015), in which the first generation can be associated with events (e.g., *Festivol*), the second generation with more personalized food experiences, such as services located in existing restaurants, development centers, and similar venues (e.g., *Cooking Classes with Local Products*), and the third generation with services that take place at home (e.g., *Tourist Farm Butul, Belajevi Homestead,* and *Xatheri*) and food tours for which direct interaction between the consumer and local producers prevails (e.g., G*astronomy Routes Menja't l'Alt Urgell, Kras/Carso Food Tour*). Food tours are a mixture of more traditional tourist services, increasingly co-created by consumers, and are therefore a hybrid or mixture of the first and second generation, combining elements of the third generation of food experiences.

The two main types of food experiences differ in terms of their motives, type of holders, and approaches, as presented in Chapter 4. It seems that food events are used when mostly public institutions, sometimes together with local associations, try to raise the visibility of local products (e.g., agricultural products) that are inherently linked to traditional agri-food productions and local identity. It is widely assumed that such recognition and valorization of local products will lead to favorable economic consequences in the long run – first, by increasing the added value of the products themselves and the overall tourist draw resulting from these products, and, second, by increasing sales of these products, not only during the event at the venue, but also later (e.g., during a revisit to the location) or elsewhere (e.g., in supermarkets where this particular product can be purchased). In the case of services, on the other hand, organizers expect short-term and immediate economic benefits from dealing with visitors. Richards (2015) already noted that creating and managing food experiences requires a complex network of different stakeholders. This analysis supports this argument because all experiences involve a large number of differently organized stakeholders (different roles), simplified here into three main models of stakeholder networks (Figure 3). According

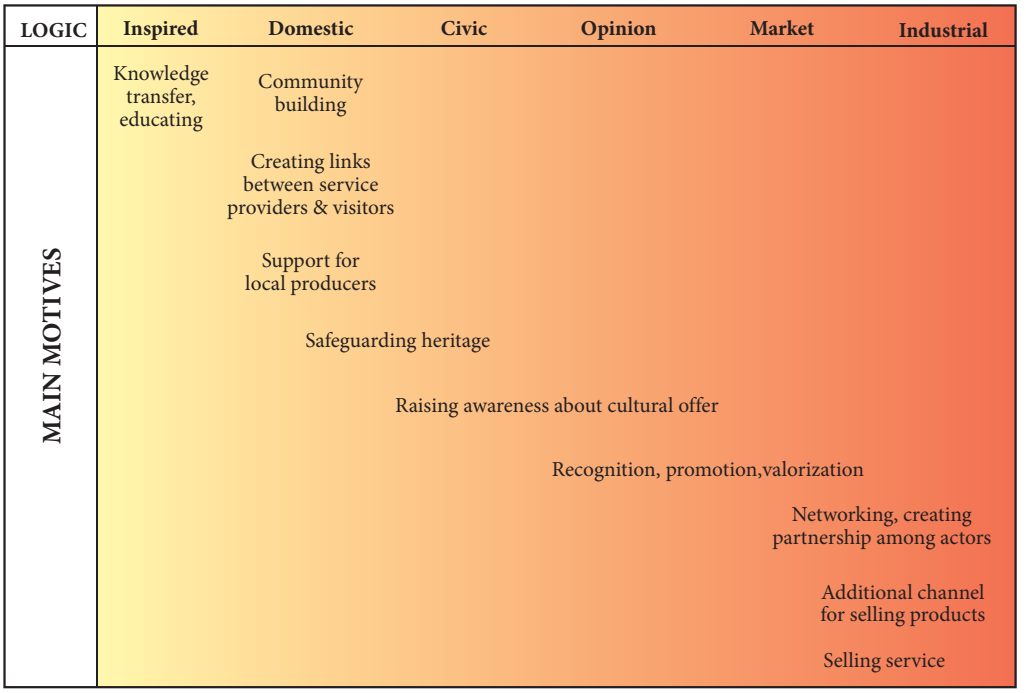


Figure 4: Motives for initiating the food experience.

to the analysis, stakeholders connect with each other in different ways. This interaction depends on the type of food experience and the initial investment required (time, resources, etc.). From an organizational point of view, it is usually more demanding to organize a food event than food service, but an event only takes place once a year, whereas a service should be carried out or offered as often as possible.

As shown in Figure 3 (Model 1), public institutions are more involved in the design of food events. The creation process is based on smaller, already existing institutional networks in which the holders have a common vision about the food experience and also share similar expectations. From this top-down position, they later invite other stakeholders to participate. On the other hand, food services are mainly organized by entrepreneurs. In this case (Model 2) as well, at least initially, communication flows in one direction, from the entrepreneur to other invited stakeholders. Over time, the entrepreneurs create their networks, work within these networks on various interrelated topics, and even exchange guests (e.g., *Tourist Farm Butul* and *Belajevi Homestead*; for more details, see Topole and Pipan 2020).

The most complex and multilateral network (Model 3) is created when the holder is a network or group of highly motivated entrepreneurs, members of a local association, or cooperatives, who are networked among themselves, seeking synergies and able to offer unique food experience(s) due to their diversity. Such a network has been observed in the case of the *Kras/Carso Food Tour*, in which two stakeholders offer traditional food and two modern cuisines, another two stakeholders are wine producers, and one of them is very good at giving cooking classes. Such an approach can strengthen resilience among food experience holders, which is particularly important in a time of a crisis (such as the Covid-19 crisis). Even if they may not receive guests for a certain period of time, they can focus on the production of homemade products, agriculture and wine, virtual cooking classes, and so on. With this type of networking, selected stakeholders in the area no longer compete with each other but start to work together by creating fair opportunities for everyone in the network. The obstacle to such an approach, however, is that those involved are less open to external stakeholders when they need someone to coordinate and sell the food service they offer. In some of the cases observed in Slovenia, it seems extremely difficult or even impossible to join a network if you are not invited.

The adaptability and resilience of the stakeholders engaged in food tourism are also reflected in their different and changing motives for participating in the networks. Taking a closer look at the producers gathered around the *Kras/Carso Food Tour*, their involvement can be observed in various food events in the region, where they share responsibility and commitment with many other regional tourism stakeholders. In this role, they raise the visibility of their destination, local characteristics, local products, and also their own products. However, involvement in the tour means more individual involvement and investment (in facilities, advertising, building sales channels, etc.), obliging those involved to bear direct costs of either success or failure.

Further synthesizing types of collaboration in stakeholder networks, two types can be distinguished. The first one is more hierarchical and formal in the sense that a stakeholder is seen as a »leader« that makes connections and invites other participants based on his or her motives in creating food experiences. Usually, the top-down approach is used, and often a leading stakeholder is a public institution (e.g., *Honey Routes in Rural Larnaca* or *From Farm to Fork*). The second type of collaboration is more informal; there is no clear leader, and decision-making within a group is consensual. This is more common when the creators of the experience are members of associations or cooperatives such as the *Kras/Carso Food Tour*. Another important aspect of collaboration is when the existing networks are open to new stakeholders to join the existing initiatives. Again, some are more closed and operate within a well-established group of stakeholders with roles already assigned, and other experiences are open to stakeholders in the sense that they can freely join the network if they contribute to the experience (see Table 4). It remains to be explored which types

Table 4: Some examples of the type of collaboration and openness of stakeholder networks in selected food tourism experiences.

Name of the experience	Type of collaboration	Openness
Honey Routes in Rural Larnaca	Formal / hierarchical	Open
Gastronomy Routes Menja't l'Alt Urgell	Informal / consensus	Open
From Farm to Fork	Formal / hierarchical	Closed
Kras/Carso Food Tour	Informal / consensus	Closed

are more suitable for creating successful experiences in food tourism that contribute to local sustainable development. However, it is speculated that more informal and consensus-building decision-making and openness to other stakeholders can facilitate communication between stakeholders and reduce tensions. As stated by Boesen, Sundbo, and Sundbo (2016), this may ultimately lead to a better-fitting logic between stakeholders and better collaboration between them.

The key message is that the mode of stakeholder collaboration greatly depends on the stakeholders' motives and attitudes toward the development of local tourism. If the main motive is more general and long-term (e.g., promotion of the destination in general, or raising awareness about culinary heritage), the type of stakeholders involved and their ways of connecting are completely different: they rely more on central, top-down, and planned communication, usually initiated by a public institution that »invites« local producers to participate. If the motives are more specific and short-term (e.g., an additional channel for selling agricultural products or services), the stakeholders usually act in a more consensual, bottom-up process and can ensure more sustainable activation and enhancement of local food resources. This confirms findings by Šmid Hribar and Ledinek Lozej (2013), who claimed that collaboration between various stakeholders, especially those with knowhow, can effectively secure, activate, and enhance financial and human local resources.

6 Conclusion

This paper provides valuable insights into the origins and relationships between stakeholders involved in food experiences in the Mediterranean area and contributes to research on sustainable development of rural areas based on culinary heritage. Based on twenty-two food tourism experiences, three main conclusions can be drawn.

First, by using top-down or bottom-up approaches, stakeholders tend to connect differently within networks. This is highly dependent on 1) types of experience and 2) the stakeholders' motives and expectations. Stakeholders can be flexible: in one case they may be a holder of an experience that invites other stakeholders, whereas in another they only participate in the presentation of their services and products.

Second, the motives for creating food tourism experiences are numerous and depend on the type of stakeholders involved. Motives range from raising awareness, safeguarding cultural heritage, community building, and knowledge transfer – all of which are significantly linked to food events organized by public institutions – to networking, finding additional sales channels, and extending tourist attractions into the off-season, which is usually presented among service providers and local producers.

Third, this study identified three models of stakeholder networks, observing the hierarchy of stakeholders and their role in creating and managing experiences. The models suggest different forms of collaboration and indicate the directions in which collaboration can develop in future food tourism experiences. In Model 3, in which a holder is a small existing network of entrepreneurs and/or members of the local association and cooperatives, it was observed that collaboration seems to be less open to other stakeholders in the local area, at least in the beginning. Therefore, it needs to be further investigated under which conditions, when, and how stakeholders in the existing network would open up and be willing to involve external stakeholders in their food experiences, and how this would contribute to local territorial development.

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DEVELOPING GASTRONOMIC PRACTICES IN THE MINHO REGION OF PORTUGAL

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Alto Minho landscape.

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Developing gastronomic practices in the Minho region of Portugal

ABSTRACT: We explore the role of restaurants and food events in promoting local and regional gastronomy in the Minho region in Northern Portugal. Interviews with restaurant owners and event organizers in this mainly rural region reveal that innovation is driven mainly by changing consumer tastes, but also constrained by consumer expectations of low prices. Restaurants maintain a family-run structure, also due to a lack of human resources. The main thrust of innovation lies in creating a convivial atmosphere, but there is less emphasis on locally produced food ingredients. In the long run this may undermine the regional food culture and its authenticity, despite the perceived importance of tradition.

KEY WORDS: sustainability, gastronomy, protection, conservation, food cultures

Razvoj gastronomskih praks v regiji Minho, Portugalska

POVZETEK: V članku raziskujemo vlogo restavracij in kulinaričnih prireditev pri promociji lokalne in regionalne gastronomije v regiji Minho na severu Portugalske. Intervjuji z lastniki restavracij in organizatorji prireditev v tej pretežno podeželski regiji razkrivajo, da inovacije spodbuja predvsem spreminjanje okusa potrošnikov, hkrati pa jih omejujejo pričakovanja potrošnikov glede nizkih cen. Zaradi pomanjkanja človeških virov restavracije ohranjajo pretežno družinsko strukturo. Glavni namen inovacij je ustvarjanje prijetnega vzdušja, manj izrazit pa je poudarek na lokalno pridelanih sestavinah. Dolgoročno to lahko oslabi regionalno prehransko kulturo in njeno pristnost.

KLJUČNE BESEDE: trajnost, gastronomija, zaščita, ohranjanje, prehrambne kulture

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1 Introduction

There has been much discussion in the field of gastronomy and tourism on the nature of authentic gastronomic experiences (Richards 2012; Sormaz et al. 2016; Fernandes 2015; 2019). Gastronomy is a cultural and social practice subject to constant change, as local and global influences combine to shift the context of local foods, their ingredients, their consumption and their popularity (Buccini and Dahlstrom 2020). There is therefore much discussion about the need to conserve local gastronomy and the best means of doing this. For example, should we try and ensure that local foods remain unchanged and untouched by shifting technologies and consumer demand, or should we try and innovate gastronomy to appeal to modern tastes?

Such debates are particularly significant in rural regions, where gastronomy lies close to a rural way of life, a web of practices related to food production and cultures of food consumption. Changing rules about the way in which food is produced (such as regulations on the use of unpasteurized milk to make cheese) (Ren 2010) and consumed (such as rules relating to food preparation and hygiene) threaten to undermine the local basis of gastronomic culture. This is occurring at the same time as the gastronomic attractions of rural regions are increasingly being discovered by tourists and promoted by local and region authorities as a means of distinguishing themselves in an increasingly crowded global marketplace.

This paper seeks to examine the relationship between innovation and tradition in the sustainability of the local foods provided by restaurants and food events. We pay particular attention to the tension between deeply rooted practices that emphasize the links between food and the local environment and community (tradition) and the pressure to adapt foods to suit the preferences of visitors (innovation). We examine these issues in the context of a single region, the Minho area of northern Portugal, where deep-rooted food practices interact with a rapidly developing food tourism scene.

1.1 Case study: The Minho region of Portugal

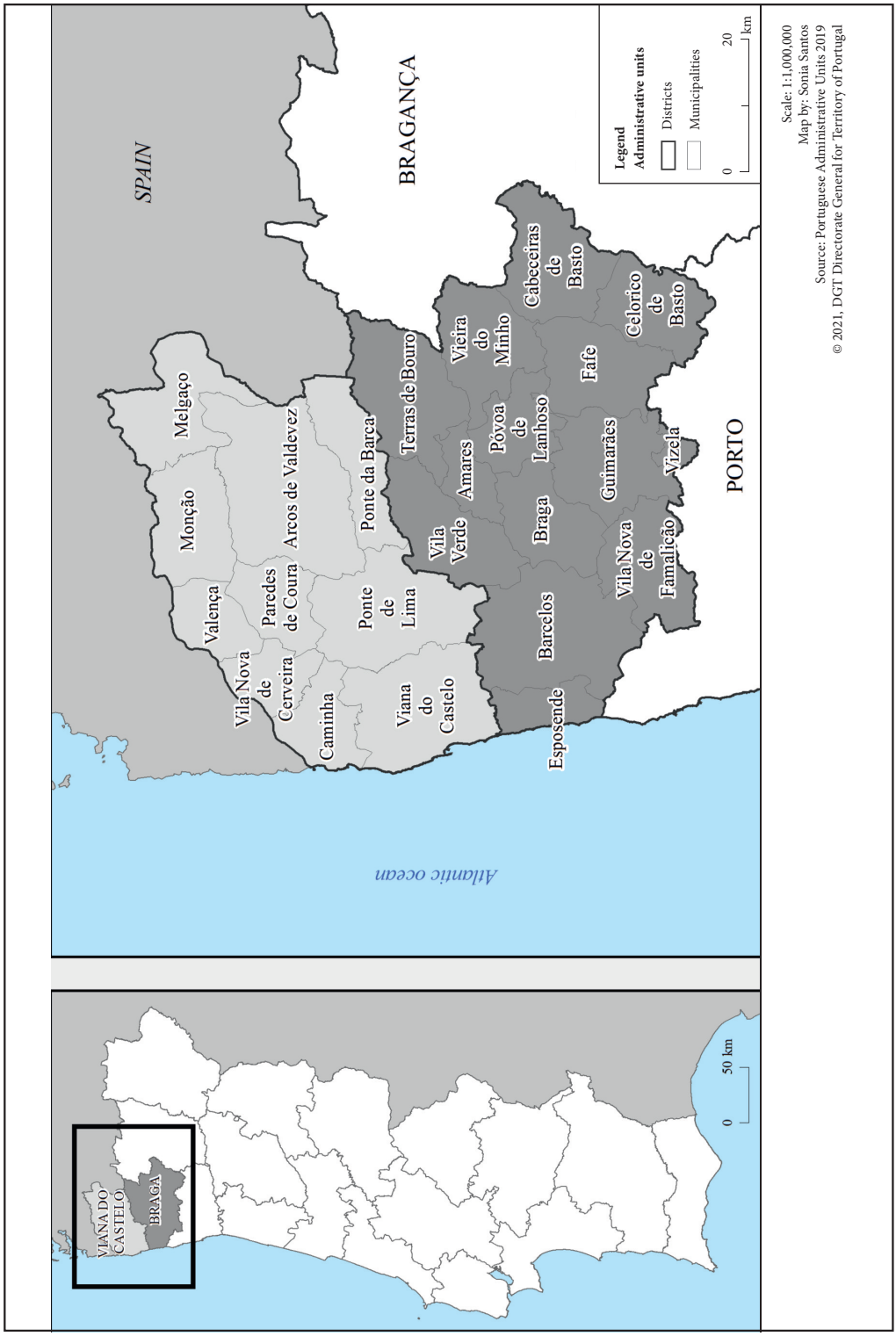
Situated in the north of Portugal, the Minho region comprises 24 municipalities, bordering on Galicia (Spain), in the north, and the Atlantic Ocean, in the west (see Figure 1). With a population of over 1.1 million inhabitants, the region is often associated with the green of its natural scenery, where water is in abundance. Minho is also typically characterized by a mountainous terrain of great beauty and biodiversity, which gradually becomes softer as one reaches the river valleys and the countless beaches along the coastline.

In Minho, land was often regarded as an »heirloom rather than as means of production« (Cabral 1978). Farmers cultivate what they need on small farms with low productivity, and they generally do not sell their agricultural products. This subsistence family farming is outdated, unspecialized and uncompetitive. Furthermore, the farms in Minho are too small to generate sufficient quantities to support an efficient regional supply chain.

Minho´s food culture is influenced by the region´s landform, soil and climate, the colonial past of Portugal and its geographic position as a bridge between Celtic and Mediterranean cultures, resulting in a diverse food culture of which the regional society is fiercely proud. Home cooking is important for the individual and for the community, and local people maintain a close relationship with nature and traditional cultural heritage. The landscape is mirror of their lifestyle and traditional food is the link between place and people. This sense of Minhoness means people see themselves as inheritors of an array of food traditions, which they also want to pass on to future generations (Fernandes 2015).

The Minho is often seen as a region in transition from tradition to modernity, and resistance to change often characterizes such transitional cultures. This also applies to food cultures. Local food production and consumption patterns and customs have become meaningful over time and are not quickly changed. Resistance to dietary changes may be traced to fear of losing the »culturally oriented significance« of food (Lowenberg 1979). Nielsen (1998) considers change and resistance as contemporary tendencies in relation to culinary novelties on the one hand and the preservation of local culinary traditions on the other hand, or as Richards (2002) poses it, the debate between gastronomic conservation and innovation. The question remains: can »old« ways of life offer »new« experiences for today´s demanding consumers? How

Figure 1: Case study context – the Minho region and its constituent districts and municipalities. ► p. 144


SPAIN
BRAGANÇA
PORTO
Atlantic ocean
Melgaço
Monção
Valença
Vila Nova de Cerveira
Caminha
Paredes de Coura
Arcos de Valdevez
Ponte de Lima
Ponte da Barca
Viana do Castelo
Terras de Bouro
Vila Verde
Amares
Barcelos
Esposende
Braga
Vieira do Minho
Póvoa de Lanhoso
Cabeceiras de Basto
Fafe
Celorico de Basto
Guimarães
Vizela
Vila Nova de Famalicão
Legend
Administrative units
Districts
Municipalities
0
20
km
VIANA DO CASTELO
BRAGA
0
50 km
Scale: 1:1,000,000
Map by: Sonia Santos
Source: Portuguese Administrative Units 2019
© 2021, DGT Directorate General for Territory of Portugal

can local gastronomic practices be sustained in a rapidly globalizing world? This paper explores the relationships between local foods and social practices, economic development strategies and consumer demand for gastronomic experiences, based on research carried out at restaurants and food events in the Minho region.

1.2 Literature review

Traditional food products are important elements of European identity and heritage, fostering the sustainability of rural areas (Guerrero et al. 2009). However, there is no common understanding regarding the concept of traditional food: »local food«, »original food«, »regional food«, »typical food« are all commonly used labels (Elss and Treu 2020). For Nummedal and Hall (2006), local food is not only about locally grown produce. It can also include food that requires raw material from outside the area, but which is processed locally and thereby given a local or regional identity. Vanhonacker et al. (2010, 472) suggest that traditional food »is a product frequently consumed or associated to specific celebrations and/or seasons, transmitted from one generation to another, made in a specific way according to the gastronomic heritage, naturally processed, and distinguished and known because of its sensory properties and associated to a certain local area, region or country.« It is a »representation of a group, it belongs to a defined space, and it is part of a culture that implies the cooperation of the individuals operating in that territory« (Bertozzi 1998, 15).

Poulain (2007) sees the act of eating as one of the essential parts of a journey, as an everyday act gives us first-hand contact with autochthonous culture and people. Cuisines where many different identities merge are a mirror of daily lifestyles, religious beliefs, habits, traditions and customs (Sormaz et al. 2015). Timothy and Ron (2013, 275) note that »food, cuisine and culinary traditions are among the most foundational elements of culture. While there is a long tradition of identifying many places with their traditional foods, cuisine is becoming an ever more important part of the contemporary cultural heritage of regions and countries«. The promotion of local food and local food traditions allows communities to develop the pride of their heritage and culture (Keeley 2007).

Traditional cuisine isn´t just made from recipes; it is born out of necessity, availability, and intuition, and it is codified not in books but in individual recollection or in common wisdom. Traditional cuisine is folklore, inspired by the world in which its creators live, imbued with lessons about that world, and passed down by a people among themselves, with infinite variation and frequent adaptation (Andrews 1996). It is a collection of social and cultural practices that are difficult to divorce from the society that sustains and is sustained by those practices, and the landscape of which it forms part. It is important to recognize that sustainable development of gastronomy is not just about preserving the past, but also about creating potential for the future.

Trends in food show an increasing importance of healthy food, local and fresh food, but also of authenticity related to tradition and the importance of production and sustainable agriculture (Schmitt et al. 2017; Ramankutty et al. 2018; Calicioglu et al. 2019; Liberato, Mendes and Liberato 2020). Thus, innovation in cuisine is not solely cognitive work but includes feelings, perceptions, emotions, aesthetic judgments, and the social position, history, and style of the chef (Gomez and Bouty 2009). Increasingly, destinations need to monitor what is it that consumers seek in regional gastronomy. Is it traditional food, the 'authentic', 'real' cuisine of a region, or is it the innovative aspects of food and gastronomy that draw the crowds? Though there are publications related to culinary innovation processes, these are still scarce and there are research gaps in relation to the drivers, barriers, sources, and diffusion of innovation in this sector (Albors-Garrigos et al. 2013).

The attractiveness of a destination is often related to its capacity to satisfy tourists' needs and expectations (Okumus and Cetin 2018). Food became a means to attract tourists (Smith and Costello 2009) searching for newness in food tastes and eating experiences (Gyimóthy and Mykletun 2009) but in the context of authenticity (Kauppinen-Räisänen et al. 2013) often explained by nostalgia, a feeling of insecurity in a quickly changing world and interest in heritage (Richards 2002).

Local cuisines are a major factor affecting destination selection and travel experience (Ab Karim and Chi 2010; Silkes et al. 2013) as food is eaten for enjoyment, for emotional release, for social prestige, and for attention, adverse or otherwise (Lowenberg et al. 1979). Tasting local food represents a core manifestation of a destination's intangible heritage, and through its consumption, tourists can gain a truly authentic

cultural experience (Hjalager and Richards 2002; Okumus, Okumus and McKercher 2007) making it a key contribution to the economy of tourist destinations (Kivela and Crotts 2006; Telfer and Wall 2000).

The linkages between food and tourism can contribute positively to rural and regional development as well as building social solidarity in protecting local culture (Bessière 2013; Polat and Aktas-Polat 2020). It is important to identify and encourage agricultural development through niche and regional products, which can stimulate both tourism and agriculture, engendering beneficial effects in terms of revenue and employment (Corigliano 2002). Restaurants and food events play a very important role in this. Restaurants are arenas where food culture is enacted. They are places where people can eat, talk, smell, taste, hear, socialise, drink, chop and fry food, hang around, generating feelings of belonging (Burstedt 2002). Food events are also intimately related with the maintenance and celebration of community values [including regional food] and are a celebration of something the local community wishes to share and which involves the wider public as participants in the experience (Hall and Sharples 2008; Blešić et al. 2014). Eating like the locals, or consuming food in the cultural contexts where it first originated, can be perceived by tourists as authentic experiences exclusively available at specific destinations (Özdemir and Seyitoğlu 2017). These gastronomic events are a way to learn about places' cultural identity (Björk and Kauppinen-Räisänen 2017) and local people's lifestyles (Özdemir and Seyitoğlu 2017). Thus, restaurants and food events are crucial sources for promoting the local cuisine as well as establishing collaborative relationships with local producers, providing unique experiences for customers, and making restaurants an important player in tourism (Dhora and Dionizi 2014).

The aim of this paper is therefore to examine the relationship between tradition and innovation in the context of restaurants and food events in the Minho region, examining factors promoting and inhibiting innovation in a predominantly traditional food culture.

2 Methods

This research is based on a literature review, field observations and interviews. The literature review sought to establish the relationship between cultural landscape, production of local food, gastronomy and tourism. This provided a context for the analysis of the data from the observations and interviews.

Unstructured ethnographic interviews and participant observations were made during a radio programme dedicated to examining the status of regional food providers and their role in disseminating gastronomy products. According to Silva et al. (2009), when seeking to understand cultural practices as located within the complexity of the everyday, a mixed method case study offers a robust means of exploration. The radio show aired every two weeks during Sunday lunch time, usually reserved for family gatherings. A researcher first joined and socialized with the people present in casual conversation to ascertain their attitudes toward local food as a complement to the interviews that followed by the program´s official host.

For the interviews with gastronomy stakeholders, 25 restaurants and 5 food related events were selected through a random route sampling method. Random route samples are widely used when no complete list of respondents is available, in order to ensure that all units have the same selection probability (Bauer 2014). Several restaurants approached turned down the invitation to interview, largely because of difficulties with scheduling.

Of the 25 responding restaurants, most were located mostly in urban areas (n=17). Generally, these are small businesses in which the husband works front-of-the-house and the wife is the cook. With the exception of three restaurants, all proprietors are originally from Minho. Seven of these restaurants had been run by the same family for over 30 years, with an ageing staff (mostly over 60 years), and were resistant to changing the daily operations of the restaurant to the convenience of customers. The other 10 urban restaurants were established less than 30 years ago, of which half in the last 15 years. There were eight rural restaurants in the sample. Except for one restaurant, all the proprietors are over 50 years old and all originally from Minho. Of the events, two were in rural areas and three in urban areas. The rural based events were all run by volunteers and the urban events were organized by restaurants or the municipality to showcase restaurants and regional foods and cultural entertainment.

Interviews with restaurant operators took place between November 2018 and March 2020, and event organizer interviews between January and May 2019. All interviews were recorded in audio and video. The interview questions were developed based on the literature review and the objectives of the study and

included questions on the food products their customers usually ordered and the customers´ gastronomic experiences. Results of the participant observation served to complement the data obtained from the interviews. Descriptive data analysis was conducted to define the operational characteristics of the restaurants and events, the perceptions of owners of the customers´ consumption patterns and the customers' attitude toward the restaurants and events during their gastronomic experiences.

3 Results

This section presents the results of the analysis firstly of the restaurants (referred to by RT number codes) and then the events (coded as EV).

The restaurants generally claim to serve traditional food based on traditional recipes, although some use their experiences of living abroad to innovate by mixing foreign flavours with the regional food, specifically Italian (RT5), Brazilian (RT17) and Galician (RT7 and RT19). RT19 states »because our customer base is predominantly from Galicia, we follow the wave of providing food which is familiar to them«.

Some restaurants located closer to the major towns diversify their offer through internationalization. According to RT1, »we provide a bit of everything to satisfy all« (RT1,2,3,6,19,20,23), not just specific dishes for different customer segments, like pizza crepes (RT2), but also with beverages like foreign beer, caipirinha (Brazilian drink-RT2) and sangria (RT19,23). Beverages play an increasingly important role in the food experience (RT1,2,7,12,16,18,21,23), generally the regional vinho verde wine, with the red served in its traditional form – in a white bowl (RT12,18,21,23), and champarrião, a derivative of vinho verde mixed with beer, sugar and 7up (RT3,25).

Other restaurants incorporate internationalisation into their name (RT1,2,17), for example adding »food & friends« (RT1) as they see it as a form of customer attraction and a sense of innovation. That attitude is also seen in the restaurants use of information technology, particularly social media such as Tripadvisor and Facebook (RT1,5,6,7,19,24). Some restaurants are more open to innovating the basic food product. As one respondent indicated, this often implies the reinterpretation of traditional dishes that might be termed »*tradinnovation*«. This seems to be driven largely by consumer demand: »Today I make things more elaborate because the customers ask for it« (RT 20). »Every year we change something in the restaurant. The question we ask ourselves is, what do we want to conquer with that change« (RT25).

Innovation is also used to avoid the pressure tradition exerts on pricing. In the Minho, customers are used to large portions at low prices. One restaurant reiterated that it »controls the portions but customers can always ask for more at no extra cost« (RT5) and »quantities cannot be small, they must be generous« (RT6) keeping to tradition of providing hearty, comfortable food. Others are quite faithful to the traditional food and their operating model is based on a practice of a set menu that includes soup, bread, choice of main course and beverage and expresso coffee at a price ranging between €6 and €8 (RT5,10,15,16).

Restaurants tend to be informal, casual with a family, festive atmosphere (RT3,4,5,8,9,10,13,19,25), with customers and staff being on a first name basis (total of 22 RT). »First friendship, then the food« (RT14), »the camaraderie« (RT20), »we talk, we hug and widen the circle of solidarity that at times is not so evident in other places« (RT18). Customers experience wonderful stories of food and drink and customer loyalty is high (RT1,3,5,8,10,16,24,25). In his Cook´s Tour of Portugal, Bourdain (2001) noted a number of specific elements of the Minho dining experience. The large groups of people who ate together. The family element. The seemingly casual cruelty that comes with living close to your food [subsistence agriculture]. The fierce resistance to change –if change comes at the expense of traditionally valued dishes.

Most restaurants are family-based and have been operating for over 40 years, in one case since 1939 (RT22). The cook is generally a woman, with four exceptions (RT5,6,11,17). Even today, in the traditionally patriarchal based society of Minho, women are more associated with the kitchen than the men. The cooks remain at the same restaurant for many years, especially at family run restaurants. Only one restaurant referred to a chef instead of a cook (RT6). The term »chef« is rarely used, and only in restaurants placing emphasis on the presentation (RT5,6), seasonal menus (RT6,24) and where »the dishes don´t look traditional but have all the elements« (RT5).

One innovative practice is that gradually more restaurants are providing food outside of the traditional set time for meals (RT1,2,7,16,24), more towards late afternoon (RT9,25) and more so on weekends, particularly restaurants on the periphery of the towns. Others are more open to serving food throughout the

day (RT5,14,15,23); »lunch continues while there is still food« (RT5). This tendency for smaller meals outside the traditional mealtimes is changing restaurant operations and models – with a growth in petiscos (the Portuguese version of the Spanish tapas). »Petiscos are the best thing we have in Minho« (RT4). »Traditional petiscos like our mothers used to make« (RT23), like our ancestors (RT24).

In terms of forms of innovation, Table 1 shows that design and atmosphere are most frequently employed.

Table 1: Forms of innovation used by restaurants (categories adapted from Ivkov et al. 2016).

Type	Restaurants
Design and atmosphere (e. g., interior and exterior appearance, friendship, entertainment)	22
Food and beverages (e. g., portion size, new ingredients)	19
Technology application (e. g., POS terminals, online reservations, social media)	5
Responsible business (e. g., social responsibility, eco-friendly packages, waste recycle)	–
Human resources (e. g., customer orientation, service climate)	14

Food and Beverage innovations ranked second, and Human resources ranked third. In particular, the two top ranked items were expected as they formed part of the criteria for selecting the sample. Technology Application (4th ranked) was mentioned as a source of innovation amongst the more recently established restaurants. However, Responsible Business was not mentioned by any respondents, reflecting the traditional focus of most operations. Overall, these mostly family run restaurants focus essentially on their friendly atmosphere and food, which is also what their customers seem to expect from them. First friendship, then the food. There was little difference between restaurants in rural and urban areas, although the older urban restaurants continue being most resistant to change.

Food events stimulate a sustainable approach to food by highlighting the social and cultural benefits of the conservation of traditional heritage, skills and lifestyle, for »awareness of the roots of a community« (EV1) and a »feast of traditions« (EV1,2) with a nostalgia for bygone traditional eras. Alongside endogenous food, the events embrace cultural entertainment (EV1,2,3,4,5). In all five events, the principal motive for the visit was the local food promoted based on home cooking. But the social atmosphere was also mentioned by all events as being important in providing a mix of »Food & Entertainment«. It is not just about the food, but also the authenticity, storytelling, and the valued gastronomic experience.

Events hosted in urban areas are organised by the respective Municipality (EV4). But events outside the towns are voluntarily organised (EV1,2,3,5) and some serve a social purpose (EV1,2,5). »*Food is served family style. The locals gather for a social cause and simultaneously pass on heritage to the new generations*« (EV1). Alongside restaurants serving the celebrated foods, locally produced products were on display for tasting and purchasing, for example smoked meats (EV4,5). Events present themselves as viable forms of keeping food cultures alive by involving local communities.

Following the same parameters as in Table 1, the forms of innovation identified at the events were Food and Beverages and Design and atmosphere (tied as the top ranked), followed in close second by Responsible Business, having to do with the social causes for which the event is being organized.

4 Discussion

Our analysis shows that providers place significant emphasis on the meal experience and less emphasis on the provenance of the ingredients. This may be linked to restaurants providing daily specials at low prices, requiring that they reduce the cost of their purchases. In restaurants that serve traditional food, customers are not usually so concerned about the origin of the ingredients and are less interested in eating local, fresh, or organic food. Enthusiasm for local produce and high-quality ingredients, the matching of flavours and a more modern style of cooking and food presentation is more evident in recently opened restaurants that are more open to innovation. Such restaurants are still not in abundance in the Minho Region, but the number is increasing. The new restaurant operators suggest that the way forward is for cooks to look for inspiration in the region´s humble peasant cooking. Dishes embedded in tradition, but not simply repro-

duced in the same way as in the past. Gastronomy should not be limited to replicating the past, but should also look forward (Fernandes 2019).

The lack of attention to food provenance has practical implications. Restaurant operators are not common visitors to food markets in Minho. In fact, the municipal food markets in Minho have fallen into disuse. There is no regional network or distribution system of locally produced products to restaurants outside the major towns. Although a significant quantity of fresh and processed food products are sold by individual small 'farmers' and producers, they face the challenge of a rapidly expanding supermarket culture featuring Portuguese chains and international operators offering more accessible prices. These trends may in the longer term undermine the traditional food culture of the region and its ability to meet contemporary demands for 'local' food.

The biggest difficulty Minho restaurants face is human resources, as it is increasingly difficult to recruit and maintain employees. They prefer to not work nights, weekends and are not flexible in terms of schedule. Minho has a significant number of hospitality vocational schools distributed throughout the region. Yet, every year these schools see their graduates look for employment in nearby Spain, where the wages are much higher. For those who do opt to remain in Minho, the turnover is very high. »In the hospitality schools they are trained with the idea of Masterchef and the reality is quite different. When faced with the reality, they usually stay a little over a month. They see restaurant professions as a hobby. The theory is very different from the practice« (RT25). The difficulty in recruiting qualified servers and cooks/chefs is seemingly persuading restaurants to adapt their operations to be less tradition-focused.

Food festivals, in particular those based on local, traditional products, appear to be ritual tools used by local communities for sustaining their collective memory and heritage (Hall and Sharples 2008; Di Francesco 2013). In so doing, the celebrated foods become ethno-commodities (Comaroff and Comaroff 2009) and these culinary products are promoted in an attempt to attract culinary tourists (Long 2004). In the past decade, Minho has witnessed the proliferation of food-related events acting as attractors for generating visitor demand. Most of these events are organised in the tourism low season as a motivation for visiting the region. But summer events also attract a booming tourist market in search of authentic regional foods. Thus, Minho is a year-round gastronomy destination.

Whereas in restaurants, the customers place more emphasis on the meal experience and less expectancy on local ingredients for the preparation of the food, food-related events in Minho use words such as »local« and »authentic« applied to endogenous food to attract consumers, particularly when the service is provided by local companies. Events also provide a more flexible food provision format that is less susceptible to the human resource pressures faced by restaurants.

5 Conclusion

The Minhoness of the people, their attachment to their history and culture, suggests that they see themselves as inheritors of an array of food traditions and gastronomic practices that they would like to pass on to future generations. However, in traditional restaurants the traceability of the origin of the ingredients and products is not so evident. Their strategy is to compete based on cost and not necessarily on the quality and origin of the ingredients. This relates to the cultural position of traditional restaurants, which provide a space for socialisation around food. This means that the familiarity of foods and relatively low prices are prioritised over innovative gastronomic practices. Some restaurants that have developed a more elaborate approach to traditional recipes are more open to using regional producers, they but tend to take a broader view of the region as extending beyond the Minho. Meanwhile, restaurants on the peripheral villages are more focused on the endogenous products and »0 km approach« and the conviviality with the customers.

Contemporary consumer behaviour suggests a more sustainable approach towards food production may be developing. There is a closer relationship between a territory and its products in terms of quality and uniqueness. There is more emphasis on local fresh seasonal ingredients and more transparency in the preparation of the food (Fernandes 2019). But strong linkages between gastronomy, local food production, fisheries, agricultural activities and tourism are not being sufficiently explored for creating added value and contributing to regional development.

For many restaurants in the Minho, the main challenge will be marrying the traditional focus on sociability and atmosphere with changing consumer demand and trends towards more sustainable gastronomy. The ability of traditional restaurants to innovate is constrained not just be local gastronomic culture, but also by lack of human resources and a weak food supply chain. Unless the links between restaurants and the regional food economy can be strengthened, this may constitute a long-term threat to the local gastronomic culture.

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LABELLING, CERTIFICATION AND BRANDING OF CHEESES IN THE SOUTHEASTERN ALPS (ITALY, SLOVENIA): MONTASIO, BOVEC, TOLMINC AND MOHANT CHEESE

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Exhibition of cheeses at the evaluation and auction, Sutrio.

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Labelling, certification and branding of cheeses in the southeastern Alps (Italy, Slovenia): Montasio, Bovec, Tolminc and Mohant cheese

ABSTRACT: The paper presents various collective instruments used in the labelling, certification and branding of cheeses in the southeastern Alps of Slovenia and Italy. Based on long term ethnography it discusses four case studies of Montasio, Bovec, Tolminc, and Mohant cheeses, that were awarded protected designation of origin at European Union level. The impact of geographical indications on the local dairy chains is compared to other instruments, ranging from top-down European and national quality schemes and inventories of traditional agricultural products and heritage, to grass-root initiatives such as Slow Food instruments and local brands. The study finds substantial difference in the use and impact of geographical indications in Italy and Slovenia, as well as several ambiguous and dissonant effects in all the identified instruments.

KEY WORDS: cheese, geographical indications, quality schemes, collective trademarks and certificates, heritage registers, the southeastern Alps

Označevanje, certificiranje in znamčenje sirov v jugovzhodnih Alpah (Italija, Slovenija): montaž, bovški sir, tolminc in mohant

POVZETEK: V prispevku predstavljamo kolektivna orodja označevanja, certificiranja in znamčenja sirov na območju jugovzhodnih Alp Slovenije in Italije. Na podlagi etnografske raziskave smo obravnavali štiri primere sirov z zaščiteno označbo porekla na evropski ravni, to so montaž, bovški sir, tolminc in mohant. Učinke geografskih označb na mlečne verige primerjamo z učinki drugih instrumentov kvalificiranja, od evropskih shem kakovosti, nacionalnih registrov tradicionalnih izdelkov in dediščine do ljudskih pobud, kot so *Slow Food* in lokalne znamke. Ugotovili smo razliko med rabo, vplivom in učinki geografskih označb v Italiji in Sloveniji ter neskladja med učinki identificiranih orodij.

KLJUČNE BESEDE: sir, geografske označbe, sheme kakovosti, kolektivne znamke in certifikati, registri dediščine, jugovzhodne Alpe

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1 Introduction

Changes in society and the economy have shifted the food system towards mass production, intensification and industrialisation, a process that began at the end of the 19th century and accelerated in the second half of the 20th century (Pratt 2007). »…food production, distribution and consumption have become increasingly entangled in global flows of goods, people, money, scientific and technological innovations, services and – last but not least – ideas and cultural trends, supported by ever faster media and communication technologies« (Parasecoli 2017, 13). These developments have given rise to a series of contestious and alternative movements focusing on five main issues: the environment, the future of small farmers, the direction of global trade relations, the rise of corporate power throughout the food chains; and food quality (Pratt 2007). The response of European Union (EU) was the »new rural paradigm« and Common Agricultural Policy (CAP), which promoted rural development as a multi-level, multi-actor and multi-faceted process, whose main characteristic was the synergy of agriculture and other activities (Ploeg et al. 2000; Ploeg and Roep 2003). This has sparked interest in the revival and qualification of local and traditional agricultural products. Several food product qualification instruments have emerged, ranging from top-down European quality schemes to bottom-up initiatives of territorial branding, oscillating between trademarks and heritage inventories, i.e. between the *properties of food* and *food property* (Mattioli 2013).

Researchers studying the impact of geographical indications, collective marks, certification marks, presidia, registers and other forms of branding have found that these tools may have positive effects on rural development as a whole (Bowen and Master 2011) helping to contribute to the preservation of rural communities in maintaining control over local production and creating opportunities for non-local markets. Nevertheless, their potential is often overestimated (Coombe, Ives and Huizenga 2014). Among the adverse effects mentioned were homogenisation, standardisation and other eventual changes in the production process due to increased production and shifting to non-local markets (Bowen and Master 2011; Parasecoli 2017). Among the ambiguous effects is also the changing role and meaning of labelled goods which, instead of satisfying personal calorific needs, connecting everyday practices and symbolising rituals, become qualified market goods (MacDonald 2013), appropriated by individual and/or external actors for non-local or niche markets (Leitch 2003) in the context of the broader process of turning rural areas into living museums for privileged urban visitors (Barham 2003). Many researchers find that geographical indications (GI), territorial brands, and collective trademarks (CT) do not reflect pre-existing differences, but instead establish and reify them (Coombe, Ives and Huizenga 2014; May et al. 2017). Such narratives show that we are consuming the product of a unique and traditional farming system. Still, the reality is far more complex, as Pratt (2007) found out that these specialty products were generated out of sustained commercial activity, state regulatory systems and international trade agreement. Crops, products, and produce are things that labelling transforms into (lower or) high-quality niche products. It is, therefore, necessary to examine the scales, power relations and interests behind initiatives that introduce new organisational forms, requirements and actors into the agro-food supply chains (Ledinek Lozej 2020).

This paper examines initiatives in relation to cheese. Cheese is a product that – comparable to wine – is simultaneously rooted in the discourse of *terroir* (and *terroir*-based geographical indications) and (traditional) skills, craftsmanship and artistry, and therefore has a latent potency in (re)introducing (re)localisation, reinvention, heritagisation and appropriation processes by various actors in the background of designation and brand labelling. And, above all, in the selected mountain regions of Italy and Slovenia, cheese was, and still is, one of the essential agricultural products, not only in the daily diet but, above all, also as a highly valued (artisanal or industrial) market product. In the words of Grasseni (2017, 4), »cheese is here the chosen pivot of broader epistemologies that are acted on the ground, mediating personal, local and scalar levels of agency.« Several authors have described contexts and outcomes of cheese designations, sometimes even »battles of cheeses« in »the heritage arena« (Grasseni 2017), as can be seen from the ethnographies in disputes over product appropriation at transnational, national and local level, between industrial and artisanal producers, and between private and community interests (Gorlach et al. 2006; Bowen and Master 2011; May 2013; Welz 2015; West 2016; May 2017; Welz 2017; Bardone and Spalvēna 2019), and especially from several in-depth ethnographies on the designation, reinvention and heritagisation of Alpine cheeses (e.g. Tschofen (2017) on the Austrian Vorlaberg Montafon sour cheese; Grasseni (2007, 2011, 2017) on the Italian Bergamasque Bitto, Formai de Mut, Branzi, Stracchino and Strachitunt cheeses;

Godina Golija (2012) on Mohant cheese; Ledinek Lozej (2020) on Tolminc cheese; Pascolini (2008) on alpine Friuli cheeses, and Čotar (1988) and Bovolenta and Romanzin (2014) on Montasio cheese).

While comparative perspectives on cheese labelscapes in the southeastern Alps of Friuli and Slovenia have been partially addressed in the framework of the research on high mountain pastures in the Julian Alps (Ledinek Lozej 2017; Ledinek Lozej and Roškar 2018a; Ledinek Lozej and Roškar 2018b), the overall picture in the cross-border Alpine region of Slovenia and Friuli Venezia Giulia (FVG, Italy) remains to be uncovered in this paper. The main research questions of our study is to explore the reasoning, the impact, and the differences between the effects of GI in Italy and Slovenia. Additionally, we have included assessment of several other collective qualification instruments, their use and their potential complementarity or eventual exclusivity with GI.

2 Methodology and research area

Having understood labelling, certification and branding as qualification instruments with differing impacts at a variety of levels, we have focused the study on presenting and comparing the four cheeses from the Friuli and Slovenian Alpine region with recognised GI at EU level – Italian Montasio cheese and Slovenian Bovec, Mohant and Tolminc cheese (see Figure 1).

In assessing the supplementary qualification tools, we only considered collective actions aimed at qualifying cheese on the basis of territoriality and/or (traditional) skills, for example, EU, national or regional quality schemes (e.g. mountain product, organic labels), territorial brands (i.e. collective trademarks), non-governmental initiatives (e.g. Slow Food), as well as heritage or traditional product inventories. Thus, in this assessment, we have disregarded private trademarks, brands and other commercial initiatives, that (might) use comparable narratives.

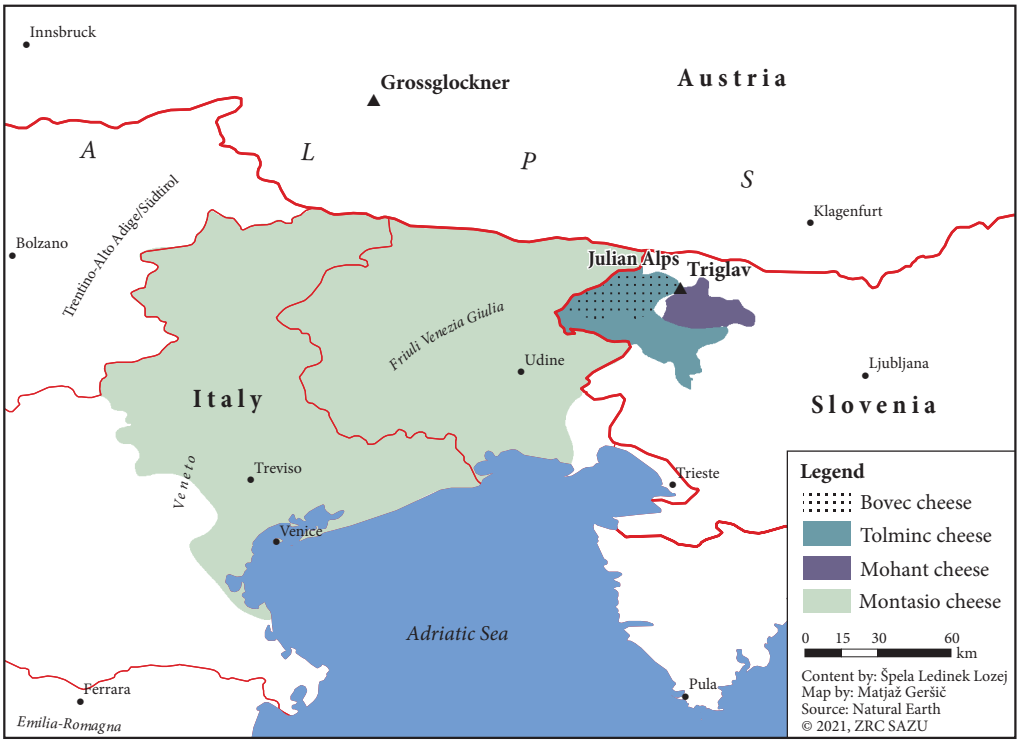

Figure 1: The production areas of Bovec, Tolminc, Mohant and Montasio cheese, as they are defined in the specifications (355/2011/EU; 187/2012/EU; 753/2012/EU; 1127/2013/EU; 1163/2013/EU).

The data was interpreted by using the qualitative case studies method, following on from Bowen and Master (2011, 75), which is particularly appropriate and useful in developing »an understanding of the contradictions or unexpected outcomes of particular processes« as they »lend themselves to emergent theories and interpretations« (Feagin, Orum and Sjoberg 1991, 277). The case study method »allows us to 'reconstruct' the existing body of literature on values-based food labels and territorially embedded agri-food systems – elaborating, correcting, and refining it – through showing how it does, or does not, account for the cases at hand« (Bowen and Master 2011, 75). Thus, the described case studies serve as a lens to analyse effects afforded by GIs and any eventual conjunctions, synergies, complementarities and exclusivities with other food qualification instruments.

The cases are drawn from the long-term ethnography of alpine pasture and alpine dairying practices in Slovenia and from the ethnography of the alpine pasture in Friuli between 2016 and 2017. Unstructured and non-formal interviews were conducted with cattle breeders (9), cheesemakers (15), shepherds (14), representatives of grazing communities (5), cooperatives (2), and regional consortia (1), managers of dairies (2), employees of regional development agencies (3) and chamber of agriculture (2), representatives of national and regional parks (2), regional museum (1), ecomuseum (2), and with a representative of Slovenian Ministry of Agriculture, Forestry and Food (1) (the interlocutors that have multiple roles are counted only once). The data was supplemented by observations with different degrees of participation, that ranged from mere observation at trade fairs, cheese exhibitions and auctions to help at varying chores in an alpine dairy or active presentation of research result at some events, where the issues of traditional food and cheese-making were discussed.

The empirical data is complemented by interpretation and analysis of primary sources, such as laws, regulations, decrees, product specifications, statutes, programmes and comparable technical literature, available in the eAmbrosia: EU Geographical Indications Register (Internet 1), as well as on the websites and registers of other (inter)national and local actors engaged in food labelling and qualification.

In case of missing references, data has been taken from field notes or interviews.

3 Results

3.1 Cheese qualification instruments in the research area

Based on our research two main types of labelling practices can be identified: firstly, purely commercial labelling practices found in commerce (e.g. sales names, private and collective trademarks); and secondly, certification or designation labelling, which may provide information on the origin of production (e.g. geographical indications) and/or technology (e.g. organic quality schemes). Behind such labelling lie either instruments based on intellectual property rights (e.g. brands, (collective) trademarks), standardisation (e.g. quality schemes, different types of registers and certificates) or specific non-governmental certification. These qualifications usually refer to territoriality, i.e. they designate the origin (e.g. geographical indications), distinct (traditional) skills and knowledge (e.g. trademarks, heritage registers, presidia) or production technology (e. g. organic farming). Some qualifications meet the requirements of various references, e.g. Slow Food presidia are location-bound, emphasising traditional skills and production technologies at the same time.

Appreciation and valorisation of the link between food and specific places have been the basis of commercial and legal frameworks in Europe since the mid-19th century (Pratt 2007; Parasecoli 2017). Precursors to such geographical indications were developed and consolidated in France for wine labelling in connection with the notion of *terroir*. France was also the first to establish its administrative system for appellations of origin; for wines and spirits in 1935, that was extended to cheeses in 1955 (Thévenod-Mottet and Delphine 2011). This relationship between *terroir* and food has gradually been adopted by other countries but remains primarily a phenomenon of the European Mediterranean (Pratt 2007). In the international arena, bilateral agreements were initially established, and have been included within the General Agreement on Tariffs and Trade (GATT) since 1947. In 1951, the International Convention for the Use of Appellations of Origin and Denominations of Cheeses (so-called Stresa Convention) was drawn up, applying specifically to cheeses and to concerns about the use of the designation of origin and the names of cheeses, and was ratified by eight European countries in 1953, with Italy among them (O'Connor 2004). Italian

legislation (Tutela … 1954) has distinguished Denominations of Origin and Denominations of Typicity since 1954. The characteristics of the former primarily derive from the production environment, while those of the latter result mostly from production methods and techniques (Grasseni 2017). In 1992 a regulatory framework was adopted by the European Economic Community to certify and authenticate products with a guaranteed or protected place of origin, and this subsumed and included national legislation (Barham 2003). Two categories have existed since then: that of Protected Designation of Origin (PDO) and that of Protected Geographical Indication (PGI) (2081/92/EEC). The PDO indicates that all stages of production and processing take place in the designated geographical area. In contrast, the PGI demonstrates that at least one step of the production and processing takes place in the area specified in the designation. A less strict category, the Traditional Specialty Guaranteed (TSG), which does not refer to a product's specific area of origin but to its traditional composition and production methods, was added in 2006 (Grasseni 2017; Parasecoli 2017). In Slovenia, GIs were protected following the Industrial Property Act; EU regulations were only adopted by the Agriculture Act in 2000 (see also Table 1).

Of the 192 PDO cheeses listed in EU geographical indications register, 53 are from Italy and four from Slovenia. Despite the sizeable Italian number, there is only one cheese from FVG, namely Montasio cheese, while there are three PDO-recognized and produced cheeses from Slovenia – Bovec, Mohant and Tolminc cheese (Internet 1).

There are several other EU, national, regional and NGO collective instruments applied to cheese qualification, based either on certification or registration, that overlap, make additional differentiations or complement GIs. They indicate and promote organic production, short food supply chains, direct sales, mountain- or protected-areas, or local products and are presented in Table 1.

3.2 Case studies: Montasio cheese (Italy) and Bovec, Mohant and Tolminc cheese (Slovenia)

Montasio cheese, the only one PDO awarded cheese in FVG, owes its name to Mount Montasio, that lies in the Italian part of the Western Julian Alps. The Moggio Udinese Benedictine Abbey owned the mountain pastures below Mount Montasio, and it is said that the monks taught alpine herders the techniques and skills for processing a firm hard cheese suitable for maturing. The first documented mentions of »Montasio cheese« date back to 1773 and 1775 and were found on the price lists of San Daniele and of Udine township in Friuli. At the end of the following century, the dairy technique became remarkably widespread with cooperative dairies in the valleys across Carnia and on the Friuli plains (Čotar 1988; Pasut, Romanzin and Bovolenta 2016). Montasio cheese had been awarded Denomination of Typicity following the Italian legislation already in 1955 (Riconoscimento … 1955). The Consortium for the Protection of Montasio Cheese was founded in 1984 with the aim of »protecting the production and trade of Montasio cheese, the use of its designation and the preservation of its typicality and particular characteristics« (Internet 2). Montasio achieved a stricter Denomination of Origin in 1986, while also benefitting from permission by decree to produce in other areas (Riconoscimento … 1986). It was awarded PDO at European level in 1996, with the first round of registration of previously protected designations (1107/96/EC). Subsequently, several changes were made to the description, production methods and labelling (2010/C 212/07; 355/2011/EU; 1127/2013/EU; 2016/C 70/04; 2017/C 286/08).

The consortium has a twofold operation; in addition to monitoring production and trade, it is also the promoter. It lobbied for the cheese to be included in the Legends from Europe program (2011–2014), which informed consumers and professionals in the USA about the EU PDO system (Internet 3). With a production of 6104 tons in 2019, it ranks seventh in Italy among cow's milk cheeses (Internet 4). Its production is widespread in across almost all FVG and part of the Veneto region (Internet 5, see also Figure 1), and there are 28 Montasio producers in FVG (and another 15 in Veneto Region), as well as 17 ripening and maturing plants (Internet 6).

Despite high production figures and general recognition, it is – as we were told by some cheesemakers – no longer appreciated as an alpine and artisanal cheese; hence there was a need for differentiation, which has been bridged by several additional qualifications based on territory of production or production technology. These included attributes such as organic production, long-term maturing (over 100 days), using only milk of the Italian Simmental breed, and labelling as a 'mountain product' (Bovolenta and

Table 1: Overview of the main cheese qualifications instruments and regulations.

	International/European Agreements	Italy (FVG)	Slovenia
Geographical indications	International Convention for the Use of Appellations of Origin and Denominations of Cheeses (Stresa Convention 1951, cited in O'Connor 2004)	Ratified by Italy in 1953.	
		National Law (Tutela . . . 1954): • Denominations of Origin • Denominations of Typicity	Industrial Property Act (1992)
EU Quality Scheme	Council Regulation (EEC) No 2081/92 of 14 July 1992 on the protection of geographical indications and designations of origin for agricultural products and foodstuffs (2081/92/EEC): • Protected Designation of Origin (PDO) • Protected Geographical Indication (PGI)		Agriculture Act (2000) (pre-accession adoption of EU regulations)
EU, national and regional quality scheme expanded – labelling of mountain and organic production		National Law (Disposizioni . . . 2002): • Produced in the mountains (a label for differentiation of EU PDO and PGI products) Regional Law FVG (Norme . . . 2002): • the regional quality scheme AQUA (Agriculture, Quality and Environment, It. *Agricoltura, Qualità e Ambiente*)	
	European charter for mountain quality food products (2005, updated in 2016) by Euromontana		
	Council regulation (EC) No 509/2006 of 20 March 2006 on agricultural products and foodstuffs as traditional specialities guaranteed (509/2006/EC): • Traditional specialities guaranteed (TSG)		
	Council Regulation (EC) No 834/2007 of 28 June 2007 on organic production and labelling of organic products and repealing Regulation (EEC) No 2092/91 (834/2007/EC)		
	Regulation (EU) No 1151/2012 of the European Parliament and of the Council of 21 November 2012 on quality schemes for agricultural products and foodstuffs (1151/2012/EU): • Mountain product	Decree of 20 July 2018, adopted with the reduction of distance (Linee . . . 2018)	Rules on quality schemes for agricultural products and foodstuffs (Rules . . . 2015b) (adopted without derogation)
	Regulation (EU) No 1305/2013 of the European Parliament and of the Council of 17 December 2013 on support for rural development by the European Agricultural Fund for Rural Development (EAFRD) and repealing Council Regulation (EC) No 1698/2005 (1305/2013/EU)		Act amending the Agriculture act (2014): • Selected Quality – Slovenia
Territorial brands: – Local certificates – Collective trademarks		Quality Certificate of the Julian Prealps Natural Park (Internet 15)	The Triglav National Park Quality Certificate (Internet 14)
		Currently developing a common certificate – UNESCO Man and Biosphere Reserve Julian Alps	
			From Bohinj (Sl. *Bohinjsko*)
Governmental registers of traditional, local and/or heritage products		Register of Traditional Products (It. *Prodotto agroalimentare tradizionale*, PAT) (Internet 9) Small Local Production	Register of the Intangible Cultural Heritage of Slovenia (Internet 19)
	Intangible Search: Inventory of the Intangible Heritage of the Alpine Regions (Internet 11)		
NGO instruments	Slow Food (Internet 20): • Arc of Taste • Presidia		

Romanzin 2014; Pasut, Romanzin and Bovolenta 2016). Probably, the most appreciated is matured cheese from the milk of the Italian Simmental cows and produced in the alpine pastures under Mount Montasio. That cheese has also been included on the Slow Food Ark of Taste (Internet 7) and is also labelled as a typical product of the Julian Prealps Nature Park but, interestingly, it is not part of the Moggio Udinese municipal designation. On the other hand, Montasio cheese from the Montasio alp is recognised by the Small-scale Local Production instrument implemented by Veneto and FVG regions and the Italian Health Authority and Research Organization for Animal Health and Food Safety, whose aim is helping small local producers reduce excessive administrative bureaucracy (Internet 8). Three dairies producing Montasio cheese are included in the regional quality scheme of FVG AQUA ('Agriculture, Quality and Environment') (Bianco, Pozzi and Tudorov 2015). In contrast, Montasio cheese is not listed in the Register of Traditional Products, even though there are 14 types of cheese from FVG (Internet 9). Neither Montasio cheese, nor any other Friuli food(-related) elements, are listed among the »intangible demo-ethno-anthropological assets« in national or regional heritage inventory (Internet 10), and also not in Intangible Search, an Inventory of the Intangible Heritage of the Alpine Regions (Internet 11). See Table 2 for different instruments on Montasio cheese.

Three cheeses have been awarded PDO in Slovenia: Bovec, Mohant and Tolminc cheese. Bovec cheese is a hard alpine cheese made from sheep's milk (and may contain a limited amount of goat's or cow's milk); Tolminc is also a hard cheese made from raw or thermalised cow's milk; Mohant is a piquant soft unmoulded cheese made from raw cow's milk. Bovec and Tolminc cheese were previously documented on the Udine price list of 1756 (Fischione 1998) and are produced in the Upper Soča Valley. Mohant cheese is made in the Bohinj area. It was also popular in other Alpine regions before the introduction of common cheesemaking. Until the middle of the 20th century, all the previously mentioned cheeses were produced in alpine pasture dairies and, to a limited extent, also in the lowland cooperative dairies. Their production declined in the second half of the 20th century. The exception is Tolminc cheese, which has enjoyed industrial-scale output at the cooperative Kobarid Dairy since 1957 (Ledinek Lozej 2020). Their production was revived and »reinvented« (Grasseni 2017) in the new glocal heritage arena, with the help of GIs and other qualification instruments at the end of the 20th century.

The first attempts to designate these locally produced cheeses with a GI did not begin until the second half of the 1990s, as new-born Slovenia moved closer to the EU, and accession negotiations also included intellectual property rights and GIs. Tolminc cheese was registered by the Tolminc Cheesemaking Association as a designation of origin at the Slovenian Intellectual Property Office of the then Ministry of Economic Affairs in 1999 under the existing Industrial Property Act (1992). Due to harmonisation of national legislation with that of the EU, the PDO was to be reapplied at the Ministry of Agriculture following new EU regulations and procedures (Agriculture Act 2000, Rules … 2003a). It was granted a PDO at national level in 2003 as one of the first food items in Slovenia (Rules … 2003b) but was only registered at European level in 2012 (187/2012/EU). The delay was a result of the Tolmin Agricultural Cooperative (the owner of the Kobarid Planika Dairy) having applied for the registration of the collective trademark (CT) 'Cheese from alpine milk – Tolminc' at the Intellectual Property Office some years earlier (Internet 12). Since then there have been two recognised Tolminc cheeses: Tolminc PDO, produced following stricter PDO specifications by certified producers, and Tolminc CT cheese, produced following more relaxed regulations by only one producer – its own subsidiary cooperative, the Planika Dairy in Kobarid (Ledinek Lozej 2020). Following the Tolminc example, Bovec and Mohant cheeses received PDO recognition at national level in 2004 (Rules … 2004a; Rules … 2004b) and at European level in 2012 and 2013 (753/2012/EU; 1163/2013/EU).

In comparison with the 43 producers of Montasio cheese, there are only three producers of Tolminc PDO cheese, three producers of Mohant and five producers of Bovec PDO cheese (Internet 13). The ratio between the produced Montasio cheese and the Slovenian PDO cheese is even lower, as the quantity of all Slovenian PDO cheese (i.e. about 130 tons of Tolminc cheese, 13 tons of Bovec cheese and 1.5 tons of Mohant cheese per year (Ogorevc 2007)) is only 2.5% of the annual production of Montasio cheese. But these numbers do not reflect the actual situation, because, as we have seen, in addition to the Tolminc PDO, there is at least 1000 tons of Tolminc CT cheese produced by the Kobarid Planika Dairy.

Two producers of Mohant cheese and two of Tolminc cheese, members of the Association of Rural Cheesemakers (Internet 14), are also part of the 'Selected Quality – Slovenia' national quality scheme, which was introduced in 2014 for agricultural products with specific characteristics in regards to production, raw materials, processing and local production and processing (Act … 2014; Odredba … 2015; Rules … 2015a; Rules … 2015b; Specifikacija … 2019) and is supported by an intensive media campaign (Internet 15).

Table 2: Montasio, Bovec, Tolminc and Mohant cheeses in relation to different food qualification instruments.

	Montasio	Bovec	Tolminc	Mohant
GEOGRAPHICAL INDICATIONS				
Organisation in charge / original name (year of establishment, number of producers in 2020)	Consortium for the Protection of Montasio Cheese / It. *Conzorzio per la tutela del formaggio Montasio* (1984, 43)	Bovec Association of Small Cattle Breeders / Slo. *Društvo rejcev drobnice Bovške* (1998, 5)	Tolminc Cheesemaking Association / Slo. *Sirarsko društvo Tolminc* (1999, 3)	Bohinj Cheesemaking Association / Slo. *Sirarsko društvo Bohinj* (2000, 3)
National year of recognition	1955 (1986)	2004	1999 (2003)	2004
EU Quality Scheme year of recognition	1996 (2011, 2013)	2012	2012	2013
EXPANDED QUALITY SCHEME				
EU				
• Organic, since 2007 (number of producers) • Mountain product, since 2005, updated in 2016 (number of producers)	• Organic (4) • Mountain product (0)	• Organic (5) • Mountain product (0)	• Organic (1) • Mountain product (0)	• Organic (1) • Mountain product (0)
National				
Name of directory or label / *original name* (year of establishment, number of producers)	Directory of Mountain Products / *L'Albo dei prodotti di montagna* (since 2003): 'produced in the mountains' / It. *prodotto nella montagna* (8)		Selected Quality – Slovenia / Slo. *Izbrana kakovost Slovenije* (since 2014, 2 members of the Association of Rural Cheesemakers / Slo. *Združenje kmečkih sirarjev*)	Selected Quality – Slovenia / Slo. *Izbrana kakovost Slovenije* (since 2014, 2 members of the Association of Rural Cheesemakers / Slo. *Združenje kmečkih sirarjev*)
Regional				
Name/*original name* (number of producers)	AQUA certificate – Agriculture, Quality and Environment / It. *Agricoltura, Qualità e Ambiente* (3)			
Internal diversification of products				
Name/*original name* (number of producers)	• Long term maturing (over 100 days) (1) • Using only milk of the Italian Simmental bread / It. *Solo di Pezzata Rossa Italiana* (1) • Montasio alp / It. *Malga Montasio* (1)			
TERRITORIAL BRANDS				
Local certificates Name / *original name* (year of establishment, number of producers)	Quality Certificate of the Julian Prealps Natural Park / It. *Parco Naturale Prealpi Giulie Marchio di qualità* (since 2000, 1)	The Triglav National Park Quality Certificate / Slo. *Znak kakovosti Triglavskega narodnega parka* (since 2011, 2)	The Triglav National Park Quality Certificate / Slo. *Znak kakovosti Triglavskega narodnega parka* (since 2011, 1)	
Collective trademarks				
Organisation in charge / *original name* (year of establishment): trademark name / *name in original* (number of producers)			Tolmin Agricultural Cooperative / Slo. *Kmetijska zadruga Tolmin* (since 2002): Cheese from alpine milk – Tolminc / Slo. *Sir iz planinskega mleka tolminc*) (1)	Municipality of Bohinj / Slo. *Občina Bohinj* (since 2015): From Bohinj / Slo. *Bohinjsko* (3)
GOVERNMENT REGISTERS OF TRADITIONAL, LOCAL AND/OR HERITAGE PRODUCTS				
Name of instrument / *original name* (year of establishment, number of producers/bearers)	Small-scale Local Production / It. *Piccole Prodizioni Locali* (1)		Intangible Search (since 2019, 4)	Register of the Intangible Cultural Heritage of Slovenia / Slo. *Register nesnovne kulturne dediščine* (since 2013, 1) Intangible Search (since 2018, 3)
NGO INSTRUMENTS	Slow Food Ark of Taste (Montasio cheese from Montasio alp)	Slow Food Ark of Taste	Slow Food Ark of Taste	Slow Food Ark of Taste

All five producers of Bovec cheese, one producer of Mohant cheese, and one producer of Tolminc cheese are certified organic producers; and two producers of Bovec cheese and one producer of Tolminc cheese have received the Triglav National Park Quality Certificate (Internet 16; Internet 17). Three producers of Mohant cheese are also among certified suppliers of the recognised 'From Bohinj' brand (Internet 18). 'The Making Bohinj Mohant' is also one of the elements included in the Slovenian Register of Intangible Cultural Heritage (Internet 19). It is, together with 'Making of Tolminc cheese', listed on the Intangible Search inventory, coordinated by the Lombardy Region as a record of Alpine foodways (Internet 11). All Slovenian PDO cheeses are also listed on the Slow Food Ark of Taste (Internet 20). See Table 2 for different instruments on Bovec, Tolminc and Mohant Cheese.

4 Discussion

Our examination of the collective labelling practices for four mountain cheeses in Slovenia and FVG has revealed a proliferation of qualification tools based on territoriality and/or (traditional) production practices. However, there are also several differences among the cultural biographies of Friuli and Slovenian PDO awarded cheeses. Montasio cheese had outgrown its original slopes under the mountain chain of Montasio in the Julian Alps. It occurred due to being reliably solid (a characteristic legendarily ascribed to Moggio monks), expansion of cooperative dairies in the 19th century, and intensive state and regional support since 1930s, when the alps below Montasio were bought by the Consortium (later the Association) of Owners of Breeding Bulls from Udine, a key player in rebuilding livestock farming in Friuli after the WW I (Pasut, Romanzin and Bovolenta 2006; Ledinek Lozej and Roškar 2018a). It has been awarded denomination of typicity at national level since 1955. In the second half of the 20th century, it became the leading regional dairy brand, and not only a flagship cheese of the FVG and Veneto region but also – as the Legends from Europe program has shown – for the whole of Italy and even Europe. The expansion of the Montasio PDO production area was complemented by internal diversification: two versions of the »mountain product label« (the additional PDO designation under national law and the optional quality label under EU quality schemes), Montasio PDO from the milk of the Italian Simmental breed, organic production, and long-term maturing (see Table 2). Additionally, there are some private labels of the respective cheese dairies, of which the Montasio alp label is probably the most valuable, since it is the only one on both the Slow Food Ark of Taste and in the Small Local Production program. At the same time, Montasio cheese was reduced from a much appreciated alpine cheese to a casual dairy product, as an alpine dairy cheesemaker in the Julian Prealps described: »We produce alpine cheese. Montasio cheese you can get anywhere and anytime, whereas alpine cheese is produced only for three months on an alp; therefore, it has a higher value.« Comparable with other »battles of the cheeses« – the most notorious is undoubtedly the case of Bitto cheese in the Italian Alps (Grasseni 2017; Rinallo and Pitardi 2019) – this originally alpine cheese was appropriated by actors at regional and national level (Ministry of Agriculture, Consortium for the Protection of Montasio Cheese, ERSA, larger lowlands cooperative dairies) that also dictated, governed and popularised further expansion and, unlike the Bitto case, internal diversification. But the majority of smaller and seasonal alpine dairies – except for aforementioned Montasio alpine dairy – did not have such possibilities, or did not want to follow the industrialised pace of the Consortium, and continued to produce predominately alpine cheeses, named *formaggio di malga*, *Çuç di Mont* or *Çuç* (that were recently listed in the Register of Traditional Products and also recognised by Slow Food).

Compared to Montasio production, Slovenian PDO cheeses are not just marketed, but they also literally are niche products – their production is limited to a narrow territory, the number of certified producers and the quantity of PDO products remains low. They were given PDO at national level in pre-accession adoption of EU regulations at the turn of the millennia, before finally being awarded at EU level in 2012 or 2013. GIs were used – comparably as in other new member states (Welz 2015; Bardone and Spalvēna 2019) – more as a tool for national emancipation by creating »European products« that are produced locally but in compliance with EU legislation, and are a proof of Europeanization and some kind of national property. In the eyes of local actors (predominantly cheese-making associations) GI was also seen as an instrument recognising local production and empowerment of the diverse modalities of the cheese production. This is evidenced by recognition of the Mohant production, but mostly of the diversification in Tolminc cheese's two modes of the production. While differentiation of Montasio cheese was internal, result-

ing in several subtypes of the Montasio PDO cheese, differentiation of Tolminc cheese was external, as there are two varieties of the Tolminc cheese production – the more artisan Tolminc PDO cheese, produced following stricter specifications, and the industrially produced Tolminc CT cheese. Such differentiation was not the case with the Bovec and Mohant cheeses, which were not industrially produced and were (far) less known outside the place of production before being awarded PDO. Despite the previously mentioned empowerment of local products, there are only a few of certified producers of Slovenian PDO awarded cheeses. However, there are many non-certified and non-registered producers of organoleptically and characteristically similar Bovec-, Tolmin-, and Mohant-like cheeses. Even though they cannot officially be sold under the designated name, they are nevertheless produced and consumed, as we were told by an alpine dairy cheesemaker in the Julian Alps: »We do not need to certify our cheese; it is the same as the Tolminc, we just don't have the right to sell it under that name. In any case, we eat it all or sell it at the same price.« And interestingly enough, it was neither PDO-certified nor CT Tolminc cheese, but the non-certified and non-registered variety of a Tolminc-like cheese that was subversive enough to be presented at the biennial Slow Food »Cheese!« event in Bra (Piedmont, Italy) (Topole and Pipan 2020).

There is a substantial difference in the impact of the long-term institutionalised endeavours for the protection of Montasio cheese in Italy and of being awarded an »European products« of Tolminc, Bovec, and Mohant cheese in Slovenia. Whereas the difference of the impact of GIs in Italy and Slovenia is substantial, the differences in application and impact of other EU quality schemes and qualification instruments are not so evident. The 'organic' label is used by certified producers and recognised by specific consumers either in Slovenia or in Friuli; the EU quality scheme »mountain product«, however, is unused by Slovenian and Friuli producers. The additional Slovenian 'Selected Quality - Slovenia' national quality scheme has been supported by an intensive media campaign, but it pertains only to the Planika Dairy and to small scale producers as members of larger networks (either as milk suppliers, members of cooperatives, or of the Association of Rural Cheesemakers). The Italian national quality scheme does not impact the dairy supply chain, while the AQUA regional quality scheme is – following a media-supported launch in 2017 – struggling for visibility and survival among producers and consumers. Producers' and consumers' recognition of the certifications proposed by the two protected parks is still being sought with the additional development of a common umbrella infrastructure in the pipeline. This umbrella infrastructure might also be beneficial in unifying the proliferated territorial brands in Slovenia. In Italy, cheeses, as well as other food and food-related traditional skills and knowledge are listed in the Register of Traditional Products, supervised by Ministry of Agriculture, Food, and Forestry, while in Slovenia these are listed in the Register of the Intangible Cultural Heritage, managed by Ministry of Culture.

Producers that adhere to the qualification instruments in question expect at least greater recognition of their products as well as other benefits, for example, reducing excessive administrative burdens for ensuring food safety, assistance with launching the products on the market, packaging, and promotion, and ultimately also higher prices. The described qualification instruments only partially guarantee it, and only to a limited extent. Sometimes labelling has also counter-effects, through additional costs and time-consuming administration, hence not all producers can meet the requirements and see it as a beneficial opportunity.

The empirical research showed that the impacts of labelling, certification and branding on the future of small farmers in the mountain region of the southeastern Alps in Slovenia and Friuli are ambiguous. Despite the general GIs' rhetoric, that fosters local production and short food chains, they remain part of the global flows of goods and ideas, anchored in the mass production and/or EU administration. The qualifications of cheeses have not had such an impact on a small scale farming, dairying, and preservation of local communities as it was envisaged by the new rural paradigm. Hence, it is not a surprise that in the recently published Farm to Fork Strategy (2020), EU announced to check the legislative framework on GI and labelling and launched the conference and consultation process on strengthening the GIs (Internet 21). The consultation process analysis shall help producers stay competitive in niche markets, provide consumers with better information, and boost regional economies. However, it shall be complemented by empirical research, for example on stakeholders' networks (see e.g. Šmid Hribar, Razpotnik Visković and Bole 2021). And, as Slovenia is the European Region of Gastronomy in 2021 (Internet 22) on the eventual overlapping with new emerging labelling (e. g. Slovenia Green) and with (food) heritagisation (Ledinek Lozej and Šrimpf Vendramin 2020).

5 Conclusion

Our comparison of the collective qualification practices in the southeastern Alps of Friuli (Italy) and Slovenia has shown differences in proliferation, range and size of production of PDO cheese and certified producers, as well as in the eventual selection of supplementing collective food qualification tools based on territoriality and/or (traditional) production practices.

The evidenced differences between Italy and Slovenia and among various complementary qualification tools support the introductory assumption of Coombe, Ives and Huizinga (2014) and of May et al. (2017) that GIs (and other collective certificates and trademarks) do not reflect differences, but they establish and reify them. The described labelling, certification and branding instruments are simultaneously instruments of qualification, differentiation and appropriation. In addition to the predominantly, but not restricted to, economic valuation of products, i.e. the creation of value defined and regulated by different actors to differentiate consumption, the intermediaries – usually decision-makers at multiple levels, but also associations such as Slow Food – emphasise the interaction between genre and territory or tradition. By doing that they essentialise the natural and cultural links between the product and the place of origin or production, thus strengthening the locality or even producing it, and establishing »value regimes« (Mattioli 2013). In these babel of labels, regulated and managed at different scales, we would appreciate some »uncontrolled denominations« (Contini 2014), aiming to deconstruct stereotyped representations, while creating new forms of conviviality.

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LUXURY FOOD TOUR: PERSPECTIVES AND DILEMMAS ON THE »LUXURIFICATION« OF LOCAL CULTURE IN TOURISM PRODUCT

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Luxury cuisine served by the local inhabitants on the Karst/Carso Food Tour.

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Luxury food tour: Perspectives and dilemmas on the »luxurification« of local culture in tourism product

ABSTRACT: This paper focuses on the Kras/Carso Food Tour to present the challenges of developing a luxury tourism product. The tour's design followed the current strategy of the Slovenian Tourist Board, which defines specific criteria for a luxury experience. Contextualized by the experiential trends in tourism, the paper juxtaposes the bottom-up and top-down perspectives on luxury experiences. The authors argue that mediation by experts familiar with academic discourses and local culture is beneficial for the development of a successful tourism product. The study contributes to the debates on luxury tourism, which have neglected bottom-up perceptions in tourist discourse and overlooked the dilemmas people face when »luxurifying« their traditions and heritage practices.

KEY WORDS: experiential tourism, luxury tourism products, gastronomy, local culture, heritage, Kras/Carso Food Tour, Karst region

Luksuzno gastronomsko doživetje: vidiki in dileme predelave lokalne kulture v luksuzni turistični izdelek

POVZETEK: Članek se osredinja na gastronomsko doživetje Kras/Carso Food Tour, da predstavi izzive razvoja luksuznega turističnega izdelka. Zasnova doživetja je sledila trenutni strategiji Slovenske turistične organizacije, ki je opredelila posebna merila za luksuzno izkušnjo. Članek, ki je umeščen v izkustvene trende v turizmu, sopostavlja poglede na luksuzne izkušnje od spodaj navzgor in od zgoraj navzdol. Avtorici argumentirata, da je posredovanje strokovnjakov, ki poznajo akademske diskurze in lokalno kulturo, ključnega pomena za razvoj uspešnega turističnega izdelka. Študija prispeva k razpravam o luksuznem turizmu, ki so doslej zanemarjale vidike turističnega diskurza od spodaj navzgor in spregledale dileme, s katerimi se ljudje soočajo pri preobrazbi svojih tradicij in dediščinskih praks v luksuzne izdelke za turizem.

KLJUČNE BESEDE: izkustveni turizem, luksuzni turistični izdelki, gastronomija, lokalna kultura, dediščina, Kras/Carso Food Tour, Kras

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1 Introduction

»Luxury is no longer the embrace of kings and queens but the mass marketing phenomenon of everyday life. Simply put, luxury has become luxurification of the commonplace,« wrote futurologist Ian Yeoman (2008, 238) more than a decade ago when describing future scenarios and trends in tourism. This tourism orientation later intensified, leading some researchers to describe it as »the luxury turn« (Bellini and Resnick 2018). Countries, including Slovenia, quickly embraced the trend; the current Strategy for the Sustainable Growth of Slovenian Tourism 2017–2021 (MGRT 2017, 13) envisions the country as a «global green boutique destination for demanding guests who are seeking a diverse and active experience, peace of mind and personal benefits«. The phrase coined to denote products for »demanding guests« has become »five-star experiences«, which have been marketed under the quality label Slovenia Unique Experiences; similar »premium experience« labels were also adopted by other countries, regions or companies. Such brands characterize what is considered luxury in a tourism sense: local, authentic, unique, experiential, boutique, and sustainably green offerings of premium quality that address people able to afford it and provide them with a special, rare »experience«.

In the late 1990s, after several researchers had already indicated this new, experiential orientation of the industry (Toffler 1970) and marketing (Holbrook and Hirschman 1982) as well as underlined the mental shift towards experiencing a quality life (Schulze 1992), Pine and Gilmore (1998; 1999) coined the term experience economy for the fourth stage of economic development (after the agrarian, industrial, and service economies). They argued that memorable events, or experiences, are a new recipe for business success. The concept was later adapted to numerous other fields, including tourism, where the experience was already recognized as its crucial aspect, especially regarding the notion of authenticity (Cohen 1979; Pearce and Moscardo 1986; Cohen 1988; Wang 1999; Bajuk Senčar 2005; Lew 2011; Manley et al. 2020). As a result, tourists began to be understood as active economic actors involved in the consumption of experiences while the crucial role of the tourism sector became to assist tourists in the production and the achievement of their experiences (Batat and Frochot 2014).

Experiential Tourism is thus not as new as we might suppose from the Slovenian Tourist Board's (STB) current strategy and orientation of Slovenian tourism. Defined as the opposite of mass tourism, it was described as a rapidly emerging trend in tourism as early as at the turn of the century (Prentice, Witt and Hamer 1998) and has since encompassed many types of tourism (Smith 2006), such as cultural tourism (Richards 1996; Du Cros and McKercher 2020; Timothy 2020), creative tourism (Richards 2011; Tan, Kung and Luh 2013; Poljak Istenič 2015; de Bruin and Jelinčić 2016; Richards 2020), ecotourism (Stronza 2001; Kozorog 2009; Fennell 2020), educational tourism (Ritchie, Carr and Cooper 2003; McGladdery and Lubbe 2017), experimental tourism (Antony and Henry 2005), heritage tourism (Kirshenblatt-Gimblett 1998; Timothy and Boyd 2003; Poljak Istenič 2013; Jelinčić and Senkić 2017; Kumer et al. 2019; Topole and Pipan 2020), nature or wildlife tourism (Curtin 2005; Kozorog and Poljak Istenič 2013; Sotiriadis 2017), and luxury tourism (Conrady, Ruetz and Aeberhard 2020). Besides its focus on active participation (or »immersion«) of tourists, the key components include environmental sensitivity, respect for local culture and people, and learning.

The luxury trend is especially on the rise in gastronomy and gastronomy tourism (Barrère, Bonnard and Chossat 2014; Bellini and Resnick 2018; Batat 2020). This is very obvious in Slovenia, the winner of the European Region of Gastronomy 2021 title. The first-ever Michelin Stars in the country were revealed in 2020. Chefs, restaurants, guest farms, and other organizations or initiatives pursue similar endeavours towards luxury. They organize top culinary events, wine, beer, or other festivals, participate in television cooking shows where the luxury culinary offer is promoted, etc.

Consequently, the level of culinary offerings in Slovenian restaurants and guest farms has risen sharply. As a result, gastronomy has become a key feature of Slovenia's tourism, supported by Slovenia's green orientation (Poljak Istenič 2016; Poljak Istenič 2018) as a promotional approach and certification scheme (such as Green Cuisine for gastronomy tourism). The promotion focuses on unique culinary experiences, especially those winning the label Slovenia Unique Experiences. As noted by Novak (2019), they give tourists »an opportunity to connect with the place they are visiting on many levels – physical, emotional, experiential, spiritual, intellectual and social«. This label also inspires tourism providers to »repack« their regular offers into luxury language and adapt to the eligibility and content criteria to apply for the brand (see Table 1).

Despite a thorough explanation of the criteria by the STB, some terms and concepts are utilized which are often disputed in the academic discourses of different disciplines (perhaps most of all authenticity; MacCannell 1976; Rickly and McCabe 2017). At the same time, they allow for a certain level of subjec-

tivity and bias in their assessment and understanding, as was revealed in the case study of the Kras/Carso Food Tour, which forms the core of this paper. The authors were actively engaged in the process of the tour formation and its assessment. In this paper, they juxtapose top-down criteria for luxury experience, as defined by the national tourism organization (STB), with the bottom-up perceptions and understandings. The aim is to reflect on the discrepancies between bottom-up and top-down perspectives on the luxury experiences and analyse dilemmas linked to the inclusion of local culture in tourism according to the popular trends of luxury experiential tourism. The authors argue that understanding the key concepts in the criteria is challenging for tourism providers, and the mediation of experts familiar with academic discourses and local culture is thus beneficial for developing successful tourism products. The applied aim of the paper is to provide recommendations to tourism providers who would like to apply for Slovenia Unique Experiences or similar labels, but also inform the creators of labels on the problems of tourism providers to fulfil the criteria. The study contributes to the debates on luxury tourism, which have neglected bottom-up perceptions in tourist discourse and overlooked the dilemmas people face when »luxurifying« their traditions and heritage practices.

The authors first present the methodology of the study, provide analysis of a bottom-up understanding of top-down concepts, evaluate the designed culinary tour according to the top-down content criteria, and in conclusion highlight the need to consider bottom-up perspectives not only for successful design and implementation of luxury tourist experiences, but also for academic debates on the future of gastronomy tourism.

2 Methods

2.1 Designing the tour

The research was carried out in the framework of the Interreg project MEDFEST: Culinary heritage experience: how to create sustainable tourist destinations (2016–2019), led by ZRC SAZU (Anton Melik Geographical Institute). The project aimed to design culinary experiences to promote sustainable rural destinations (Internet 1). In Slovenia, the work was focused on the Karst region. The cultural landscape of the Karst, a limestone plateau in western Slovenia, is defined by numerous natural elements and processes (e.g., areas without water, underground water, caves, the bora wind, karst commons (*gmajna* – a mosaic of meadows, former pastures and forest edges with botanical species), etc.). Disadvantageous living conditions caused the development of a specific way of life, strongly characterized by stone elements and structures (e.g., dry stone, shepherds' cottages, houses, architectural details). This has created a particular landscape image today intensely used in tourism (Ciglič et al. 2012; Fakin Bajec 2015). The Karst-Brkini destination, a rural hinterland area where the research was situated, lags behind the nearby coastal region. Škocjan caves, Lipica stud farm, fortified historical village Štanjel, and the Karst edge are the key tourism attractions. Other heritage sites mostly revive during thematic festivals (the Teran and Prosciutto Festival, the Lavender Festival, the Karst Gmajna Festival, etc.). Gastronomy providers are also included in local cycling or hiking tours or other tourism offers (Fakin Bajec 2011; CPOEF 2018).

ZRC SAZU researchers involved in the MEDFEST project collaborated with the Planta Association for the Development of Agriculture and Tourism in the Karst Region. Its members were already working on a new culinary experience and needed the experts' help to enrich the activities and put the tourism product into practice. The Komenski Kras Tourist Organization was also involved in the project's pilot action. The researchers worked intensively with eight members of the Planta Association. Following the participatory research on culture-based development (Nared and Bole 2020; Fakin Bajec 2020a), they actively involved different stakeholders in developing activities from the beginning of the pilot action. The researchers conducted semi-structured interviews with members of the association, who came from three Karst restaurants (identified as R1, R2, R3), two tourist businesses (i.e., two guest farms, identified as GF1, GF2), and three farms producing various products (wine, prosciutto and other dried meat, cheese; F1, F2, F3). The main purposes of the interviews, conducted in April and May 2019, were to recognize the history of their restaurants, farms and/or villages, the structure of current guests, their culinary offer, the philosophy of their cuisine, the promotion of Karst cuisine, and the way they promote themselves and collaborate with the local population and associations. At the end of the conversations, the interviewees were also invited to express their wishes, expectations and ideas for the development of new luxury culinary experiences.

During the discussions, the researchers asked the interlocutors to explain the terms used in the criteria for being awarded the Slovenia Unique Experiences label, such as »tourist experience«, »authenticity«, »sustainability«, »heritage«, and »traditions«. In this way, the researchers could better understand the perceptions, interests, and demands of the association's members, which helped them develop luxury culinary experiences. The interviews were then transcribed and used by one of the paper authors to create the content and slogans of the culinary tour. For the purpose of this paper, the authors analysed them with attention to interlocutors' understanding of the concepts mentioned above. The aim of the analysis was to reveal bottom-up perspectives on luxury gastronomy tourism.

The researchers then organized an interactive workshop for the local tourism providers they have interviewed to present the results of the ethnographic research and design thematic culinary experiences that would sustainably promote, preserve and develop the local culinary offerings based on tradition but adapted to innovative demands. Finally, after a year of additional work with the tourism providers, the »Kras/Carso Food Tour: A Unique Journey into Experiencing the Taste of the Authentic Karst« was created and presented to a broader public. In the end, four sub-thematic tours were designed (described in section 3.1), all promoted under the common label Kras/Carso Food Tour (Internet 2).

2.2 Testing and evaluating the tour

Seven experts from different fields (tourism, ethnology, geography, economics, architecture) were invited to test and evaluate the tour when it was designed (at the end, the driver of the test tour was also included in the evaluation). One of the authors of this paper participated in the test tour and, for the purpose of this paper, analysed it according to the criteria set up by the STB for its label Slovenia Unique Experiences. These criteria were chosen for the evaluation because the Planta Association intends to promote it as luxury gastronomy tourism and apply for this label in the future.

According to the criteria (Novak 2018; Internet 3), the experience must reflect the **local identity** and promote it through a story. Since the best promoters of identity are usually the local inhabitants, it is recommended that the tourists interact with them. The tourism products shall also include local gastronomy and souvenirs as material representations of the locality. The criterion of **authenticity** implies that the experience represents nature, culture (cultural heritage, way of life, cultural industries) and people of the region – but not in a staged way or copying other tourism destinations. It should also highlight the area's **uniqueness**, represented by natural features, cultural offerings, accommodation, and adrenaline experiences. A strong **experiential** note is given when the tour provides a positive emotional, multi-sensory, and active experience, allowing the visitors not merely to monitor, visit or see but to cooperate, become immersed in, and learn about the local culture. The packages must also ensure all the aspects of sustainable (**green**) management. Targeting small groups and using a personal approach ensure that tourists have a **boutique** (and not mass) experience. A **premium** offer is ensured by quality schemes (e.g., Slovenian Green Cuisine), training for all the tourism workers, and cleanliness standards. The experience creates an **added value** by appealing to the visitors willing to pay more and ensuring that financial assets stay in the local community. The tourism product should not be limited only to summer (**deseasonalization**) and must contribute to the STB's strategy of turning Slovenia into a green boutique destination for a **five-star experience** (this criterion was later replaced by good digital experience; STB 2020).

Based on participant observation during the test tour, a qualitative evaluation was performed to assess how the tourism providers, with the help of experts, understood the top-down luxury criteria defined by the STB and succeeded in implementing them for a food tour design. The results of the evaluation of one of the paper's authors are presented in Table 1.

3 Results and discussion

3.1 Bottom-up perspectives on luxury experiences

The Kras/Carso Food Tour promotes Karst nature and local cuisine (ingredients, dishes, traditions, knowledge and tastes). It encompasses diverse experiences that provide tourists with hands-on learning about Karst cuisine and related phenomena, such as landscape, plant gathering, agriculture, culinary traditions, and family histories. The providers follow various approaches; some have built on family traditions, others

have developed high-quality cuisine, while some have designed new tourism products. The biggest challenge for the experts and the Planta members was how to ensure a «premium«, »boutique«, and »authentic« experience with »added value« and other features defined in the STB's criteria that would not only make the culinary tour eligible for the label but also distinguish it from the luxury culinary experiences offered by other Slovenian operators.

There is a general agreement that the Karst landscape is **unique** because of its geological and related cultural features (classical Karst is thus also included on UNESCO's Tentative List for World Heritage; UNESCO 2020). However, the ZRC SAZU researchers, as well as the members of the Planta Association, struggled to determine how to demonstrate this uniqueness through culinary packages. Following the increasing orientation towards tourism experience and the impact of the luxury turn in gastronomy, the president of the Planta Association, who manages a guest farm, stressed that:

> »Foreigners are extremely enthusiastic about all this [Slovenian culture]. If you take a foreigner to your farmstead and he feels he has been received heartily, he is delighted. /…/ Sitting here, sitting in the shade of the vine, and being able to look at it – he is already satisfied with that. /.../ When you take them to the field, it is already an experience. When you bring them here in this courtyard, it also makes a difference.« (GF 1)

The other guest farm whose owner was interviewed served as an inn for horse and cart drivers (*furmani*) in the 19th and the first half of the 20th century. The discussion revolved around what could be prepared and offered to **surprise** the tourists, as this is one of the requirements for a memorable experience (Novak 2018). The interviewee suggested driving the guests in a horse carriage through a nearby town and »stopping by the traffic lights« (GF 2). On the other hand, for the chef of a top restaurant, the element of surprise is the use of heritage in an unusual way. They serve soup to the guests in a whetstone holder (*oselnik*):

> »… an ox horn, which was once used as a tool for manually mowing grass. The horn was put on the back of the mower, and inside were vinegar and a whetstone for sharpening the scythe. [...] Well, now we have adapted it to pour the soup [on the plate]. We only put dumplings, a beef tail, a little celery, and carrots on the plate – what gets cooked in the soup – and then pour soup over it. This makes a difference.« (R1)

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Figure 1: Welcome reception at the Ostrouška Pelicon guest farm, Coljava.

Many guests find the idea of utilizing a local heritage element previously used in agriculture for serving food appealing. Still, the question arises as to the value and perception of such heritage by the local inhabitants. Farmers who, in the past, manually cut grass and often stuck their hands into the horn would probably have reservations about the new function of the artefact. At the same time, many ethnologists would judge it pejoratively as a folklorism and thus inauthentic (Poljak Istenič 2008; Poljak Istenič 2011).

This leads to the next challenge when designing the luxury tourist package: how to adapt local heritage elements to contemporary use and lifestyles to preserve the authentic flare? According to MacCannell (1976), postmodern tourists are motivated to travel precisely by seeking **authenticity**. He implanted Goffman's concept of front and back regions (Goffman 1959) into tourist studies and argued that front regions are arranged to deceive the tourists. In contrast, back regions stay closed and thus inspire tourists' curiosity. However, the criteria for luxury experience imply that the providers should offer a glimpse into the »backstage« and even let tourists experience it. Therefore, an important question to reflect upon is how heritage is understood, interpreted, and used for tourism purposes by providers and the local inhabitants who can convince tourists something is authentic. UNESCO has already influenced the understanding of heritage as a mix of tangible and intangible elements that embody the values and meanings of heritage bearers. The respect for those values and attitudes indicates to the tourists that the heritage is authentic. As shown by the example of an ox horn for pouring soup, the help of experts could be beneficial in search of heritage to be used in tourism »authentically«, especially when the usage in an unprecedented way could offend the feelings of heritage bearers.

Some local inhabitants already feel offended because some community members, at least in their opinion, do not treat heritage respectfully, especially the work invested in preserving and presenting it. As they stress, it is thus hard to expect tourists to properly appreciate local heritage if the local inhabitants themselves do not do it:

> »We must respect each other and our work. But we will begin to respect our work when we know our history /…/ That is why it is necessary to raise awareness. To make the locals aware so they start appreciating themselves. /.../ [Tourists] come to buy ten litres of wine, and the locals on their initiative also offer slices of prosciutto, homemade bread, and salami, but only charge for ten litres of wine. That means you do not appreciate yourself. That means you put yourself on sale.« (R2)

Another interviewee also expressed that tourists should »learn that [how to make prosciutto and properly offer it] is a real science« (GF 2). Prosciutto supposedly has a unique taste when sliced by hand. The tourism providers thus think that instructing their guests on making a thin slice of prosciutto would grant an **added value** to their offer. The owner of a top restaurant already offers tourists a workshop where they can learn about the entire process of prosciutto production:

> »We offer a tour around the place where the prosciutto is made, where you can not only peek through the door but get introduced to the entire process. /…/ We go to the old place where we dry prosciutto, where we have old artefacts in the courtyard, and [we can explain] how pigs were butchered. We also have old tools there. /…/ We also go to the place where we have silhouettes of fresh pork legs [which hang from the ceiling]. We show how to salt them. We explain the whole drying process, from the fresh pork leg to prosciutto.« (R2)

Haute cuisine, in particular, is considered cuisine with added value. It often relies on healthy and local food, promoting »zero kilometres« from the field to the table – or the **green** criteria for luxury experiences (although STB focuses more on green management than ecological food production). According to the respondents, »zero kilometres« in a Slovenian context indicates a supply chain no further than »up to seventy kilometres«:

> »Whatever we need – potatoes, celery tubers, chicory, wild asparagus, or wild plants – we get from the locals. These are local ingredients. /…/ Now, I cannot tell them to grow lettuce for me in the Karst because it needs a lot of water. The farmers [in such cases] send me somewhere else [to a farmer outside the Karst].« (R2)

However, as revealed in the interviews, the biggest problem that food providers in the Karst face is the acquisition of the key ingredient of the Karst cuisine, prosciutto:

> »Here we dry meat, here we salt it, that is it. The whole process takes place here in the Karst. But everything else comes from all over Slovenia. /.../ [Therefore], unfortunately, prosciutto cannot be

> a 'zero kilometre' product because we are very strict [with our demands] to have a certain quality of prosciutto. Now we could go to the first farm breeding the pigs. There [the farmer] provides two square metres for pigs [when bred]. But our demand is [using] fifteen square metres per pig, which means they can move a bit. This increases the quality of the meat.« (R2)

One member of the Planta Association (F1) thus decided to breed the only Slovenian autochthonous pig breed – the Krškopolje pig – in the traditional way: the pigs were fed home-grown vegetables and lived outdoors. But a problem arose in dry seasons when there was no food because of the drought; there are unfavourable natural conditions for producing large quantities of home-grown vegetables in the Karst region. Furthermore, this breed takes four years to raise. Thus, the farmer gave up in a few years, angry that the local food companies producing prosciutto do not breed pigs or financially support local farmers. For such reasons, local providers fulfil the concept of »zero kilometres« by using seasonal ingredients. However, this is also why they doubt whether they fulfil the green criteria for a luxury experience.

The majority of the Planta Association members want to continue the culinary tradition of their grandparents because it represents the era before the development of mass tourism and can be characterized as **boutique**. A few decades before Slovenia's independence:

> »… tourists came by bus /.../ tried prosciutto, maybe 'jota' [soup with sauerkraut or turnip], maybe something fried in breadcrumbs, and that was it. Everything, I will say, was done faster. /.../ Later, depending on the place, we saw that this did not work [anymore]. /.../ There were no [more] orders from companies nor union trips, so you had to adapt to the situation.« (R2)

Some providers also make cheese and experiment with adding karst herbs to increase the **uniqueness** and value of the final product. However, they still ponder how to add value to the tourist experience. In this regard, a suitable place for cheese making would be karst caves, but the problem is, as expressed by the owner of the Karst farm, that:

> »… in our country, it is not possible to make cheese in a karst cave, while in Italy, this is possible. In Slovenia, it is not legally possible, although some people park their cars in the cave. It is forbidden to use a natural cave because you must obtain a concession which is granted by the state for the use of state resources.« (F2)

Using the natural environment in such a way as suggested above would, in the opinion of the interviewees, definitely contribute to the criteria of uniqueness and differentiate their tourist offer from those in other destinations. However, the question of whether such use of natural resources is **sustainable** was hard to answer. Interlocutors had difficulty defining the term sustainable and generally associated it with reducing waste (which is also indicated in the green criteria for luxury experiences) as well as consuming local and seasonal ingredients. But the owner of the guest farm highlighted that sustainability also indicates:

> »… preserving this tradition of the house. What is produced is also cooked. To stick to these original tastes. And to develop [cuisine] at the same time, so that you 'grow' in the culinary world without stopping.« (GF2).

However, from the authors' point of view, sustainability is already embedded in the way of life practiced by members of the Planta Association (Nurse 2006, Labrador and Silberman 2018). Besides buying and consuming locally and relying on ecological production, they also cooperate and help each other, which results in building a close-knit community with a strong local identity. However, until recently, they have not recognized the potential of cooperating with other associations in the Karst. Although they have a good relationship, they have not considered them partners in tourism (Fakin Bajec 2020b). People who safeguard local heritage, master different traditional skills, or are good storytellers could help them with tours, workshops, and events. They can help tourists become »immersed in the life of local people«, as suggested by the criterion of authenticity, and trigger positive emotions to make experiences more memorable.

3.2 Evaluation of the designed tour according to the top-down criteria

This chapter first describes the sub-tours of the Kras/Carso Food Tour and then evaluates them according to the criteria of the STB for luxury experiences. However, as the sub-tours are not yet put into practice nor thoroughly described and fixed – flexibility allows them to be adapted according to the tourists' pref-

erences and time constraints – a thorough evaluation according to all ten criteria was not possible. The assessment was made for a test tour and was adequate to recognize how successful the bottom-up understanding of the criteria's concepts was as well as some gaps to be addressed by the tourism providers should they decide to register the tour under the label Slovenia Unique Experiences.

The Kras/Carso Food Tour consists of several stops in restaurants and on farms offering local cuisine, accompanied by sightseeing of local attractions, presentation of practices, and workshops. Local guides and tourist providers interact with tourists and engage in storytelling to allow them an insight into the local culture. Due to the intensity of the tour (number of visits, quantity of food, duration, etc.), four sub-tours were designed to highlight the main symbols of local culture and identity: 1) herbs, 2) prosciutto, 3) winemaking, as well as the ability of local chefs to include them in 4) high-end cuisine. The sub-tours described below promote a distinctive food or *haute cuisine* while the accompanying sightseeing is left to the tourists' desires and thus not included as a fixed element.

The spring tour »Karst herbs – relaxation and enjoyment of flowering karst meadows and commons« raises awareness of the botanical diversity of the Karst. Karst spring cuisine is marked by the early fresh herbs and has been characterized by herbal *frtalja* (omelette; Figure 1), dandelion salad, and vegetable minestrone. For the tourists, the *marenda* (morning snack) is served in an herbal garden to present how local people ate during times of major farm work. Besides enjoying food, the guests learn about local wild plants, the skills of picking herbs, and the preparation of herbal soaps, ointments, and tinctures.

The second tour, »Karst prosciutto – a culinary treasure as the product of years of experience and the natural curiosities of Karst,« revolves around an essential element in Karst cuisine – dried meat products, especially prosciutto. The guests get to know the entire process of salting and drying prosciutto and learn how to best slice it by hand.

The third tour, »Karst winemaking – climate, red soil, knowledge and hardworking people«, is dedicated explicitly to Teran, the most well-known Karst wine (Figure 2). It revolves around the history of viticulture in the Karst as well as the production of Teran and white varieties of wine. The providers invite guests to their wine cellars. They taste selected wines and learn about Karst cellaring and the most important Karst celebration linked to wine, *bendima* (the grape harvest).

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Figure 2: Presenting Teran wine in the cellar at the Buntovi farm, Škrbina.

Table 1: Evaluation of the Kras/Carso Food Tour according to the content criteria for luxury experience elaborated by the STB (2020).

Criteria		Justification	Gaps
Local: The experience is based on local identity, is faithful to the nature, culture, and people of the area, and throughout the story supports the brand and identity destinations.	(1.) Based on the local identity (nature, culture, people) (2.) Interaction with the local population (3.) Souvenirs reflecting the local identity	Local providers, continuing the family or house traditions (1.) Home-grown vegetables, locally bred or produced meat, local herbs (1.) Presentation of local culture (food, production, processing, traditions) by the locals (2.) Self-made souvenirs by the tourists, linked to the characteristic food (*štruklji*/dumplings) (3.)	Herbs and high-end cuisine weakly linked to local identity (1.) No professionally designed souvenirs for tours with no suitable workshops to make them on the spot (3.)
Authentic The package offers a pristine, original experience and does not imitate or borrow experiences from others.	(4.) Performance in an authentic way, not staged (5.) Faithfulness to the nature, culture, and people of the area	Storytelling (linked to the offering) done by the locals (4.) Inclusion of guests in a process (workshops) (4.) Focus on the symbols of local identity: prosciutto and Teran (5.) Utilization of original places of food production and processing (gardens, courtyards, cellars, drying rooms, kitchens, etc.) (5.)	Non-original functions of certain types of heritage (e.g., tools) (4.) The lack of locally raised pigs for prosciutto (5.)
Unique: The experience has an element of uniqueness and valorizes the most unique sales opportunities of the provider/destination.	(6.) Based on the specialty or uniqueness of the area (7.) Based on the specialty or uniqueness of Slovenia (8.) Clearly expressed elements of difference from other packages (9.) Carried out in an exceptional, special, unique location (nature, culture, accommodation, etc.)	Focused on local/regional (Karst) specifics (6.) Prosciutto and Teran recognized as unique, nationally important heritage (European quality schemes) (7.) Karst recognized as an exceptional landscape (UNESCO 2020) (9.)	The lack of clear justification of originality/difference from other culinary tourism packages (8.)
Experiential: It has a strong experiential note and addresses the visitor on an emotional and practical level.	(10.) Inclusion of tourists into the experience (workshops, tastings, participation, activities, etc.). (11.) Tourists learn something new (12.) Surprise (13.) Appealing to all the senses and emotions (14.) A story (told by the providers or guide) with educational and green character	Inclusion of tourists into gastronomic processes through workshops (10.) Hands-on learning (cooking, gathering herbs) and learning through explanations and demonstrations in original settings (meat drying, winemaking) (11.) Addressing all senses: sight, hearing, taste, smell, touch (13.) Storytelling by local tourism providers and guide – education linked to local nature and culture (14.)	Surprise not clearly defined; flexible unofficial tour (unknown what is part of the tour and what could be regarded as a surprise) (12.)

Green: Ensures all the essential elements of sustainable operation.	(15.) Distinctive green aspect (sustainable mobility, nature park, local gastronomy, cultural identity (16.) Education on green features of the region and Slovenia and on green responsibility (17.) Communicates Slovenia green certification	Promotes and supports local culture and the environment (15.) Ecological production and short supply chains (15.) Awareness-raising on Karst landscape, biodiversity, local natural and cultural heritage (16.)	Not yet certified or properly communicated (17.)
Boutique: It offers the visitor a sense of individuality and a boutique-like experience.	(18.) Organized for smaller groups in an intimate way (19.) When visiting a mass attraction, entry is separate and without waiting (20.) Individual approach (personalization, individuality, consideration of special needs)	Organized for smaller groups, allowing interactions (18.) Avoidance of mass attractions, no waiting times (19.) Flexible tour adapting to tourists' wishes and needs (20.)	
Premium: It ensures premium quality – guarantees high quality services throughout the whole purchase route.	(21.) A quality scheme – contacts with the guest in all phases are identified, constant quality is guaranteed (22.) Special training of the people involved (23.) Highly qualified guides with appropriate licenses (24.) The provider includes a five-star concept in all its operations and training	Local guides and providers with thorough knowledge of local culture and environment (23.)	A quality scheme is not elaborated (21.) Special training not defined (22.) The difficulty for consistent inclusion of five-star concepts due to many providers (24.)
Added value: Due to the strong experiential note and strong engagement of people, the experience creates higher added value and appeals to the demanding visitor, who is willing to pay a little more for a special experience.	(25.) Motivational experience valuing the guest (26.) A critical mass of offerings, attractions, activities that motivate the purchase (27.) Financial benefits remain in a local community (local supply chain) (28.) Good ratio between price and quality (benefiting providers and tourists)	Engaging providers motivate tourists to explore the local culture (25.) Combination of many attractions to pause between eating (26.) Local providers relying on local producers (27.) Good ratio between price and quality and quantity of experiences (28.)	
Deseasonalization: Motivating tourists with good content for a visit outside the summer	(29.) Provided outside the three summer months	A flexible tour allows for visiting all year round (29.)	Some elements are seasonal (e.g., herbs, different stages of wine production) and thus not available to experience in full all year round (29.)
Five-star / Gastronomy	(32.) Local offer (food and drink) (33.) Seasonal offer (34.) Authentic offer (typical for the area) respecting gastronomical pyramid	The ingredients are locally grown or bred (32.) The food served is seasonal (33.) Dishes are characteristic for the Karst region; Teran and prosciutto as the main dishes belong to the top of the gastronomical pyramid accompanied by other representative food and drinks from the middle section (34.)	The lack of locally raised pigs for prosciutto (32.)

The fourth tour, »Karst high-end cuisine – where the tradition of classic inns encounters contemporary creativity«, is based on the old catering business already well developed in the 19th century. It promotes local flavours and ingredients (also from the other three tours) as the critical components of *haute cuisine*. The boutique and authenticity of the offer are further enriched by tasting menus, artistic arrangements of food, wine accompaniment, additional tastings, and the time that chefs and waiters dedicate to the guests to teach them about tradition and modernity through top-quality food.

Based on the active participation in the test tour, the evaluation (Table 1) reveals that the tours fulfil most of the content criteria for a luxury experience. We can thus conclude that the tourism providers, despite struggling to understand the national criteria for luxury experiences (see Chapter 3.1), succeeded in implementing them in a tour design in line with the national tourism strategy – with the help of experts familiar with academic discourses and local culture who discussed different conceptual meanings with them and debated over the use of local traditions and heritage practices for tourism purposes.

However, the authors also detected possible gaps which could be addressed to increase the added value of the Kras/Carso Food Tour and be used by the tourism providers and organizations to improve their product. The following assessment thus serves to fulfil the applied aim of the paper.

The effort of the tourism providers should be devoted to linking the herbs and *haute cuisine* more convincingly to the local identity and the selection of souvenirs not made by the tourists on the spot. As some ingredients (herbs) and some stages of food production (e.g., of wine) are seasonal, the tours need to define several ways to promote them in all seasons. The same applies to weather; providers need to have a back-up plan for outdoor activities. The only issue which cannot be solved is the lack of locally-bred pigs for prosciutto; however, as this product already earned a Protected Geographical Indication label, its local character is not disputed. Special attention must also be given to the use of cultural heritage for new purposes, as it can quickly destroy the tourists' perception of authenticity. Furthermore, as the tour is not defined (and described) in detail, it is hard to validate what is supposed to be a surprise for the tourists, recommended to be provided for fulfilling the experiential criteria.

Other deficiencies of the packages mainly concern the background work not directly linked to the tourist promotion. It would be beneficial to conduct a study of similar food tours to underscore the tour's originality. The providers should also strive to earn any of the Slovenia Green certificates (at least the Green Cuisine) and elaborate on promoting this brand and communicating it to tourists. The most problematic criterion is uniqueness, which guarantees high-quality services throughout the whole purchase route. The problem lies in the absence of a powerful organization that would market the tour. Despite the good impression of the offering's quality gained on the test tour, the providers have not yet set up a quality scheme to ensure a consistent level of service, nor have they organized special training for all the people involved. Furthermore – especially in light of the considerable number of tourism providers – the lack of strong organizational and promotional support also hinders the consistent inclusion of luxury criteria (or concepts) in their actions and consequent improvement of their services.

3.3 General recommendations for tourism providers and tourist sector

On the one hand, the evaluation results provided in the previous chapter can be used more or less only on the local level, i.e., by the Karst tourism providers. On the other hand, the general assessment indicates what tourism organizations anywhere should give their attention to.

We recommend them to demonstrate strong links to local identity; figure out how to overcome the seasonality of the offers; take into account changing weather conditions and adapt the tour accordingly; and carefully plan the use of cultural heritage in tourism together with their bearers. The inclusion of local heritage can effectively contribute to the added value of the tour. Still, if the local way of life is not interpreted sensitively and authentically, it can hinder the involvement of the local inhabitants – key for the perception of the authenticity – as well as devalue heritage (Bogataj 1998). It would also be helpful for tourism providers to familiarize themselves with tourism strategies and labels before designing the tour, as this would make them aware of the quality schemes, certifications, training of staff, and other operations which do not directly involve the tourists but are necessary for a luxury product. This would make branding the product easier when put into practice. They could also analyse similar tours to avoid being one of many providers of the same experience. Strong organizational and promotional support is crucial for successfully implementing their tourism products; ensuring it already in the planning phase would help them in the process

and later to develop supplemental tourism activities. And to stress again, it is advised to engage experts in case they have difficulty understanding top-down recommendations and criteria.

4 Conclusion

»A destination of five-star experiences« is the current, luxury-oriented vision of Slovenia in the tourism context, which has demonstrated the popularity of »the luxury turn« (Bellini and Resnick 2018). It has been realized through the activities of the STB, including branding tourism products under the label Slovenia Unique Experiences. The criteria ensure that the tours are of premium quality and guarantee the tourists »experiencing a story in a very personal way, at its original scene, in touch with locals, in a way that has not been copied from elsewhere and is in line with the sustainable principles in tourism« (Internet 4). On the other hand, the luxury concept and promotional support of the STB also motivate tourism providers to develop or adapt existing tourism offerings according to the criteria for winning the Slovenia Unique Experiences label, as has been the case of the Kras/Carso food tour presented in this paper.

Top-down approaches often fail to translate into productive, sustainable, and long-lasting activities of the communities they address (Fakin Bajec 2020c). The criteria for luxury tourism products are thoroughly explained by the STB and seem to be applied easily to tourism products when one is acquainted with the terms and concepts used as well as the history, heritage, and traditions of the area in question. However, the ethnographic analysis presented in the paper revealed that the concepts of authenticity, uniqueness, local, etc. – as well as the core term of experience – are subject to very personal interpretations. This poses a particular challenge when designing luxury tours, especially concerning the use of heritage for »authenticating« the experience. The researchers involved in the MEDFEST project, including the authors, thus made a considerable effort to discuss with tourism providers not only their ideas, wishes, knowledge, shortcomings, and strengths but also the meaning of the terms and concepts. The mediation of experts familiar with the terminology and theory deriving from academic discourses proved beneficial, as shown by the evaluation of the food tour according to the content criteria. As it revealed only minor shortcomings, we can conclude that the intervention of the experts (i.e., researchers) in designing the tour crucially contributed to the understanding of the criteria for luxury tourism products and consequently to the successful tour design and its implementation. In cases where experts do not get involved, local providers – in the authors' experience – often shy away from designing luxury tourism products despite the great potential for their realization.

The authors' analysis of the case study, in which top-down criteria and bottom-up interpretations were juxtaposed, proves that an integrated, multi-level participatory approach (Poljak Istenič 2019; Fakin Bajec 2020d) is not only successful but also urgently needed for the successful development of luxury tourism. In this particular case, it led to a food tour design with the potential to obtain the label Slovenia Unique Experiences, which would significantly improve its promotion outside the regional context. Furthermore, local traditions and heritage practices, usually perceived as too simple and not sufficiently elite, proved crucial for the luxurification of the experience, fulfilling the criteria of originality and authenticity, uniqueness, and being boutique – although the process was also heavily debated due to contested views on the use of local culture for tourism purposes.

The paper also shows why bottom-up perspectives are crucial for the analysis of the tourism discourse. Strategic documents for tourism development rely on academic concepts, but since communities or other tourism providers generally do not have sufficient knowledge to understand them, the translation of the strategic or action plans in practice often fails to produce desirable outcomes. This paper has revealed the need to consider a bottom-up understanding of luxury tourism to ensure its development also outside elite areas and services. When expert mediation is provided, luxury tourism can flourish in rural areas, use unremarkable local heritage, or rely on people's traditions.

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GASTRONOMY AS A SOCIAL CATALYST IN THE CREATIVE PLACE-MAKING PROCESS

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JOŠT GANTAR

Gastronomy event as a center of urban life.

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Gastronomy as a social catalyst in the creative place-making process

ABSTRACT: This paper examines the integration of gastronomy in the creative place-making process. The study is based on the interviews with the organizers of five gastronomy events: a cooking workshop, a gastronomy festival, a series of gastronomy events at museums, a gastronomy theatre performance and an intimate dinner event. The contextual analysis shows that gastronomy events can contribute to five important features defining quality of place: diversity, liveliness, innovativeness, creativity and openness/tolerance. The final phase of our study brings comparison with findings in art-based place-making studies and discusses on diversity, integration in development policies and replicability potential of analyzed gastronomy events.

KEY WORDS: creative place-making, food, events, art, community building, quality of place, urban geography

Gastronomija kot družbeni katalizator v procesu ustvarjanja prostora

POVZETEK: Članek preučuje vključevanje gastronomije v procese ustvarjanja prostora (*place-making*). Študija temelji na intervjujih z organizatorji petih gastronomskih dogodkov: kuharske delavnice, gastronomskega festivala, niza gastronomskih dogodkov v muzejih, predstave gastronomskega gledališča in intimne večerje. Analiza konteksta kaže, da lahko gastronomski dogodki prispevajo k petim pomembnim značilnostim, ki opredeljujejo kakovost prostora: raznolikost, živahnost, inovativnost, ustvarjalnost in odprtost/strpnost. Zadnja faza naše študije prinaša primerjavo z ugotovitvami v umetnostno naravnanih študijah in razpravlja o raznolikosti, vključevanju v razvojne politike in možnosti ponovljivosti analiziranih gastronomskih dogodkov.

KLJUČNE BESEDE: ustvarjanje prostora, hrana, dogodki, umetnost, razvoj skupnosti, kakovost prostora, urbana geografija

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1 Introduction

Gastronomy is not a new topic in place-based theory. It has been widely studied before, but mostly in the context of tourism: as event tourism (Everett 2012; Lew 2017), experience tourism (Richards 2002; Richards 2012; Andersson, Mossberg and Therkelsen 2017; Williams, Yuan and Williams 2018) and heritage tourism (Bessiere 2013; Rinaldi 2017; Topole in Pipan 2020). As local and authentic, or imported and »transplanted« (Lau and Li 2019), gastronomy was recognized for its place-branding potential rather than its place-making implications. In their analyses, scholars were focused mainly on the reactions of the visitors, their satisfaction with culinary experiences and the feeling of authenticity (Wijaya et al. 2013, Bryce et al. 2015; Kumer et al. 2019; Topole et al. 2021). It was also important to understand how the local communities identify with the current culinary tourism offer (Tsai and Wang 2017) and how this affects the experiential value of the place and the success of the place-branding policies, which integrate gastronomy as one of the unique cultural assets each area has to offer.

The overview of research dedicated to creative place-making reveals the dominating focus on art and its different manifestations (performances, events and centers), which are recognized as one of the most evident economic and social catalysts in the community (Rota and Salone 2014; Rembeza 2016). However, can gastronomy, food and cooking play this role as well? Answering this question requires a deeper understanding of gastronomy and food as vectors of social inclusion and participation of community members, which exceeds the scope of direct economic benefits such as through tourism. The goal of this paper is to start filling this gap.

2 Theoretical grounds for the study

2.1 Creative place-making

Creative place-making is a contemporary form of place-making, increasingly focusing on decentralized actions and initiatives, which substitute for or at least complement more traditional approaches, such as establishing cultural and art centers in neighborhoods (Markusen and Gadwa 2010; Boichot 2014). In creative place-making the social character of the neighborhood becomes as important as its physical character, the process of engaging the community is as crucial as the final outcome – for example, art performances, exhibitions or murals (Rembeza 2016).

Creative place-making can be strategic, planned and formalized (Markusen and Gadwa 2010) or it can be unconventional, bottom-up and even coincidental (Rota and Salone 2014). It is the »creativity« that is at the heart of its definition, but views on this also differ. Some authors argue that the creative process can only be artist-driven, or at least that local arts and culture should be activated, whereas for others everything involving humans is creative in its essence (Salzman and Yerace 2018). However, who are the »humans involved« and who represents community when talking about creative place-making?

Schneekloth and Shibley (2000) explain that place-making is not just about the relationship of people to their places; it also creates relationships among people in the place. These relationships are the backbone of the social capital that can emerge in communities and among them. Townley et al. (2011) distinguish two types of social capital that develop as a product of the creative place-making process. The first one is bonding capital, which is manifested in social and emotional ties within a homogeneous group, creating a sense of identity and belonging. The second one is bridging capital, allowing the creation of links between groups, which is crucial for the creation of open societies such as those that welcome tourists, migrants, refugees, exchange student, pilgrims and others among themselves. Following these findings, it can be concluded that a place-making community cannot be limited only to the people that have grown up, lived and worked in a neighborhood, despite the fact that they are often proclaimed as being the first rightful beneficiaries (Thomas, Pate and Ranson 2015). Kullberg et al. (2010) agree that places are defined by both residents and outsiders. The potential of creative place-making to augment social capital is even more evident in urban neighborhoods, where it can replace the bonding role of disappearing traditional associations (Dumont 2005), which are more typical and enduring in rural areas (Salzman and Yerace 2018).

2.2 Role of art in creative place-making

Unarguably, the most recognized and the most studied medium of creative place-making is art, which has different functions in forming places (Kwon 2002): art in a public space, art as a public space and art in the public interest. It is the third function that is in our focus because it accentuates the engagement of art in social issues rather than in the built environment: its ability to empower individuals, to induce change in areas in crisis (Puleo 2014), to influence the true vitality of a place and to create dialog with marginalized social groups (Thomas, Pate and Ranson 2015; Rembeza 2016). In this process, art is becoming an economic catalyst, encouraging innovation and collective actions (Thomas, Pate and Ranson 2015), and also a social catalyst (Markusen and Gadwa 2010; Kaplan 2015; Pavluković, Stankov and Arsenović 2020), creating not only a feeling of connection across diversity (Kim and Miyamoto 2013) but also affecting the quality of life in communities and improving public health, the (sense of) safety and the liveability of a place (Thomas, Pate and Ranson 2015). For Jorgensen (2015), an artist can be an »interlocutor for social change,« and for Markusen and Gadwa (2010) also a substantial contributor to the ascent of the cultural industry. It is due to its catalytic potential that art is often integrated in urban revitalization programs through initiatives on various scales – from flagship, prestige and internationally renowned projects to smaller communal revitalization initiatives (Hall and Robertson 2001; Dragićević et al. 2015; Rembeza 2016). Gastronomy and food have been recognized as catalysts as well: catalysts for improved cultural understanding (Santich 2007) and economic development, especially tourism (van Westering 1999), the food industry (Richards 2002) and the creative industry (Hurtado Justiniano et al. 2018). Therefore, research approaches used to understand the role of art in creative place-making can make a significant contribution to expanding the study also on the food and gastronomy.

2.3 Formal vs. informal initiatives

An institutional framework and support are not prerequisites for creative place-making (Salzman and Yerace 2018). Studies of unconventional, bottom-up and unplanned initiatives (events, street parties, etc.) show that they too can be linked to a large spectrum of place-based implications: economic, social, cultural, political and ethical (Rota and Salone 2014). They exhibit a higher level of commitment, identification and participation of community members and an inclination toward experimentation, including replicating and readapting practices from elsewhere (Stevenson 2020). They offer not only aesthetic enjoyment (linked to art), but also entertainment in encountering other people, conviviality, and enjoying food and drinks (Crozat and Fournier 2005; Stevenson 2019), all of them being important drivers of sensing the community and sensing the place (McCunn and Gifford 2018).

2.4 Gastronomy in human geography studies

The first studies addressing the role of gastronomy in urban space date back in 1950s. Since then, we can follow constant development of this research field, formulated around four groups of approaches: spatially oriented theories, behavioral theories, non-spatially oriented theories and theories concerning urban governance (Figure 1; for details see Kowalczyk 2020).

Contemporary gastronomy research is focusing mainly on its non-spatial dimension, especially the economic value. Gastronomy has gained importance with the rise of experience economy, which »suggests that businesses must create memorable events for their customers, and that memory itself becomes the product i.e., the experience« (Pine and Gilmore 1998, 102). The model is based on four components that induce the experience: entertainment, education, aesthetics and escapism (Richards 2014). Creating experiences has become main development orientation in gastronomy tourism. We are witnessing the *foodification* process – drastic transformation of functions, mainly in urban spaces, in order to increase the sale and consumption of food for the purpose of tourism (Bell and Binnie 2005; Loda, Bonati and Puttilli 2020). *Foodification* can lead not only to regeneration of place, but even further – in gentrification of neighborhoods and overtourism (Zukin 2008; Loda, Bonati and Puttilli 2020).

Due to its strong economic potential and cultural significance for the community, gastronomy has important role in planning and governance projects. These can include place-making activities, which reflect

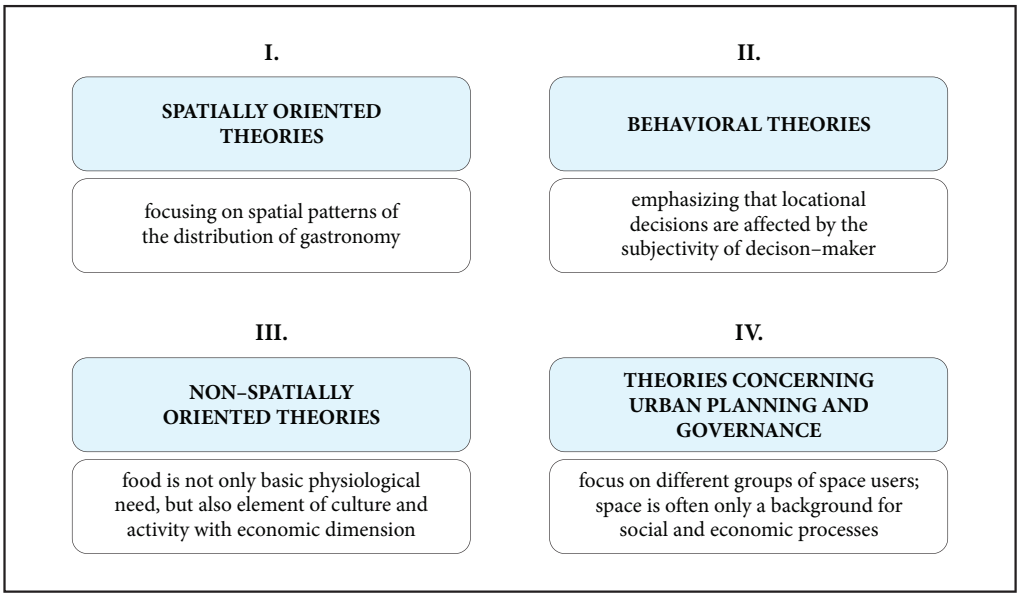


Figure 1: Development of gastronomy related concepts in urban studies (adapted by Kowalczyk 2020).

the physical and social character of a neighborhood (Lugosi and Lugosi 2008); cultural mapping, which serves the purpose of the conservation/protection of cultural diversity (du Randa et al. 2016); or *festvalisation,* which aims to increase the attractiveness of the city, for both the residents and visitors (Cudny 2016). All mentioned activities are leaning on the creativity potential of the gastronomy (Kowalczyk 2020).

Florida (2005), the author of the creative city concept, recognises the gastronomy as an important amenity, that attracts the members of creative class to become either inhabitants or visitors in the city and represents important part of their lifestyle. Dimitrovski and Crespi Vallbona (2018) call this process a cultural consumption, which makes cities attractive according to the perceived quality of life and lifestyle led in them.

Florida's concept is criticised for being too narrow since it considers only creative, even elite social class, while it underestimates the innovative businesses (Moretti 2012), doesn't acknowledge the class of deprived, poor, and »non-creative« ones and promotes instrumentalization of the culture (d'Ovidio and Rodríguez Morató 2017). However, the role of gastronomy in cities remain unquestionable: through eating establishments and culinary events it creates places of social concentration, affects the city's economy and is important feature of the quality of place (Kowalczyk 2020).

The quality of place consists of those characteristics of a community or territory that make it different from other places and attractive as an area to live in, work in, and/or visit. Reilly and Renski (2008, 14) define it as »community's environment, civic traditions, cultural amenities, and recreational opportunities«. In order to measure the quality of place, some authors combine indicators of several factors of quality of place into a single index e.g creativity index (Florida 2005) or investigate different aspects of quality of place individually and comparatively (Reilly and Renski 2008; Bahar Durmaz 2012). The concept of quality of place served as a framework for identifying and exploring the place-making implication of gastronomy events presented in this paper.

3 Methods

This study is based on in-depth semi-structured interviews with organizers of five different gastronomy events: a cooking workshop, a gastronomy festival, a series of gastronomy events at museums, a gastronomy theatre performance and an intimate dinner. While the results from a small sample may not fully relate to a wider population of gastronomy events it was deemed that they would provide valuable insight to the

explored issues. In order to ensure variance, events were selected considering the territorial level (neighborhood, city, network of locations, etc.), who the initiator is, link to public programs, the complexity of the organization and the actors involved. Three interviews were carried out in Paris, one in Angoulême and one via a video call. However, the locations of the interviews do not indicate the locations of the events themselves (see Table 1, Figure 2). Information about the frequency, status and location of the events corresponds to their status at the time of the interviews – April 2019.

Interview topics were organized in a way which would enable us to firstly, gather facts about the content and development of the event, people engaged in organization and the participating public and, secondly, collect the information indicating the role of food and gastronomy in the event, its place-making potential and the challenges organizers faced. Interviewees allowed us to audio record the conversation and provided also the supporting materials for the analyses: reports, photographs and collections of press clippings. The languages of the interviews were English or French, depending on the preference of the respondent.

In solving the methodological dilemma how to explore the place-making implication, we leaned on key elements and features of quality of place identified in place-making literature, which we adapted for the analyses of the gastronomy events (Table 2). They served as contextual framework for content analysis.

Table 1: Selected gastronomy events for the study.

Event name	Launch year	Type of event	Frequency (at interview time)	Status (at interview time)	Event location	Territorial level
Rhythm & Cook	2018	Cooking workshop	Monthly	Ongoing	Paris, France	Neighborhood
Les Gastronomades	1995	Gastronomy festival	Yearly	Ongoing	Angoulême, France	City
A Place at the Royal Table	2018	Series of gastronomy events in the museums	Series of events in 2018	Finished	22 royal residences across Europe	Network of locations
Sonomaton	2016	Gastronomy theater	On program	Ongoing	Rennes (France); Tanger (Maroco); Sibiu (Romania)	Network of locations
Ecosistema	2017	Intimate dinner	Occasional in 2017 and 2018	In quiescence	Paris (France); Bari, Taranto, Lecce (all Italy)	Neighborhood

Table 2: Selected elements and indicators of quality of place.

Element	Indicators described in place-making studies (Florida 2002; Gertler 2004; Trip 2007; Bahar Durmaz 2012; Evans 2009)	Indicators adapted to gastronomy events
Diversity	• Functional diversity • Distinctive neighbourhoods • Sufficient density	• Diversity of uses of space • Diversity of the content and themes, engaged actors
Liveliness	• Cultural and musical events • Live performance venues per capita	• Revitalisation and inclusion of local community • Communication • Interactivity • Voluntarism
Innovativeness	• Patents per capita • Relative percentage of high-tech output	• Introduction of innovative gastronomy events • Combination of different activities
Creativity	• Percentage of artistically creative people	• Inclusion of different activities • Introduction of new themes
Tolerance, openness	• Relative percentage of foreign-born people	• Inclusion of different social groups • Cultural exchange • Behavioural change

The findings were structured around these themes with detailed descriptions of examples from each study case. At the end of the result chapter we made a synthesis and presented it in Table 3.

4 Study cases

4.1 Rhythm & Cook

This monthly workshop in the 14th arrondissement in Paris was launched in 2018 by six students of Cultural mediation studies. The initiative started as a student project with one common objective: to work on integration of refugees in their hosting community. They wanted to create an event where people of the neighborhood (local residents and refugees) could engage spontaneously in cooking and making music.

4.2 Les Gastronomades

This yearly event dedicated to gastronomy takes place in Angoulême every last weekend in November. At the beginning, in 1995, it was intended mainly to support gastronomy publishing, but eventually it started to promote agricultural products and addressed the public more directly with show-cooking and cooking workshops. Over 25 years, the event expanded spatially by engaging the entire city of Angoulême.

4.3 A Place at the Royal Table

This series of events focusing on food culture and culinary traditions took place in several locations across Europe: at 22 royal residences, which are members of the Network of European Royal Residences (Figure 2). The project was initiated to celebrate the European Year of Cultural Heritage in 2018 with an inventive and flexible concept. Each participating residence was free to design its own events in line with the financial and human resources available.

4.4 Sonomaton

Compagnie Mirelaridaine is a culinary theatre from Rennes and Sonomaton was one of the theatre's projects (the organizers called it a »tool«), launched in 2016. It took place in two phases. The first phase (the survey) consisted of interviewing the residents of cities of Tangier (Marocco) and Sibiu (Romunia) about their culinary heritage, stories and memories. The second phase (the staging) was creating a show in a theatre with a native artist from the country of the interviews and active inclusion of spectators.

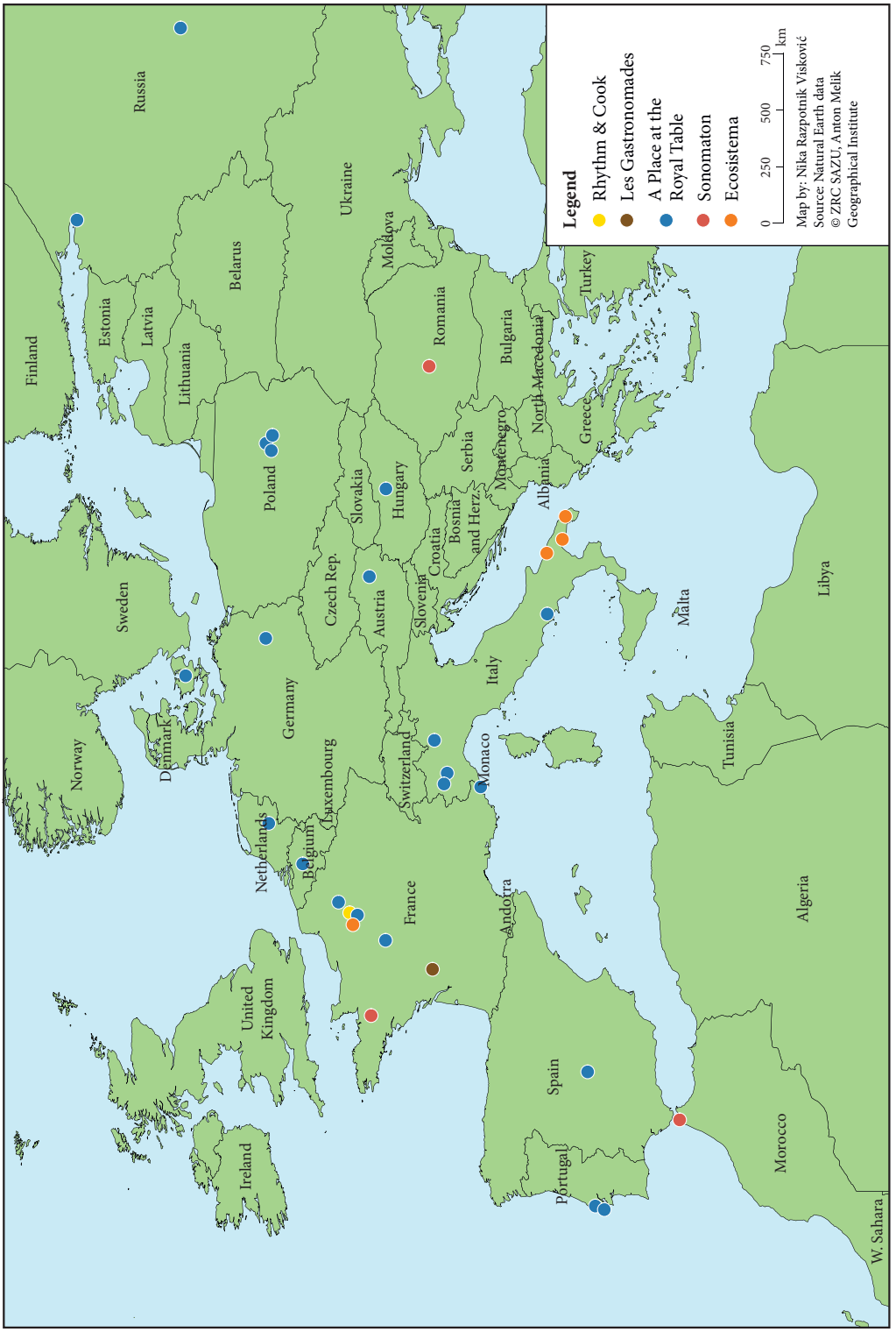
4.5 Ecosistema

Ecosistema was a series of four events (i.e., dinners), where participants were engaged in exchanging food among themselves, and where they fed each other. Two of the events, the first in Bari and the last in Paris, were held in a private space with invited guests, and the other two dinners in Taranto and Lecce were held in an open space and were accessible to the public.

5 Results

Exploratory analysis of the interviews revealed how selected gastronomy events addressed five different place-making elements (diversity, liveliness, innovativeness, creativity and tolerance/openness). In the description of the results we use initials of the events: Rhythm & Cook = R&C, Les Gastronomades = G, A Place at the Royal Table = PRT, Sonomaton = S, Ecosistema = E.

Figure 2: Locations of selected gastronomy events. ► p. 192


Legend
Rhythm & Cook
Les Gastronomades
A Place at the Royal Table
Sonomaton
Ecosistema
0 250 500 750 km
Map by: Nika Razpotnik Visković
Source: Natural Earth data
© ZRC SAZU, Anton Melik Geographical Institute
Russia
Finland
Estonia
Latvia
Lithuania
Belarus
Ukraine
Moldova
Romania
Bulgaria
Turkey
Greece
North Macedonia
Albania
Montenegro
Serbia
Bosnia and Herz.
Croatia
Slovenia
Hungary
Slovakia
Poland
Czech Rep.
Austria
Germany
Sweden
Norway
Denmark
Netherlands
Belgium
Luxembourg
Switzerland
Monaco
Italy
Malta
Libya
Tunisia
Algeria
Morocco
W. Sahara
Spain
Portugal
France
Andorra
United Kingdom
Ireland

5.1 Diversity

In case of two events (R&C, G) we observed the multi-purpose use of the public spaces where events are taking place. R&C was organized in a collective café, which plays an important role in the community. The café is located on a small square surrounded by residential-commercial buildings, which serves also as a meeting point for local inhabitants and playground for children. It's especially busy on Sundays (the usual time of the workshops). Café building is made of glass, so it is possible to see inside, observe the activities and decide to enter. R&C workshop were thus attracting attention of people living in the neighborhood and passers-by. The main venue of G is the exposition area L' espace Carat in the northeast part of the city Angoulême, but there are many other secondary locations, mostly markets scattered around the city and municipal halls in the mainly disadvantaged neighborhoods.

Diversity in the content of the event was accentuated in two cases (R&C, PRT). During the R&C workshops, participants from Sudan, Afghanistan, Maghreb and the neighborhood created a variety of simple dishes mainly with the use of different spices or condiments. The process of engaging in the workshop was open and creative; it was possible to make traditional dishes or experiment with new recipes, but in a heterogeneous group of people that wanted to take part. In case of PRT developing a program linked to food was an opportunity for network members to work on the history of each residence and common European history, but from different perspectives which resulted in more than 100 unique sub-events and activities.

5.2 Liveliness

Contribution to liveliness, vitality and dynamism is one of the strongest place-making implications of our selected cases. Two interviewees (R&C, S) pointed out the universal value of cooking as means of communication – cooking allows exchanges among people without them having to speak the same language, and it thus creates sense of equality.

Additional dimension of liveliness that we've identified is inclusion of local inhabitants. R&C mobilized people from neighborhood, who started to volunteer and became engaged in preparing the workshops themselves. We also shouldn't overlook the contribution of local grocery and market vendors, who supported the project by donating their unsold products in generous quantities. Among our selected events, G and PRT attracted mostly tourists, but they dedicated part of the program explicitly to local community. Royal residences are cultural, aesthetic, historic and consequently tourist hotspots, often located in prestigious districts. However, one of the PRT objectives was to offer something new to the local community, especially local visitors with annual passes, already familiar with permanent museum collections. To this end, the Palace of Versailles, for example, held thematic visits in the gardens dedicated to pineapples for local people with an interest in botany and vegetable gardening. In case of G, part of activities too is targeted exclusively at local inhabitants. One of them are cooking workshops taking place in disadvantaged neighborhoods, which are dedicated to raising awareness about the benefits of home cooking with local products. Another such initiative is joint local endorsement of annual *menu gastronomad* which is cooked and served in all city schools, retirement homes, hospitals and at businesses with their own cafeterias. The festival activities are not limited to the formal three-day weekend program in dedicated locations; they extend beyond it in the temporal and spatial sense.

Creative place-making initiatives are often integrated in urban revitalization programs and this aspect was mentioned in the interview with the organizer of E. In Paris edition, event took place in a former industrial (coal) area in the southern suburbs that nowadays host music and other artistic events as part of urban revitalization strategy. In Lecce the dinner was held as the first in a series of events at the opening of the local cultural center. The location of the event was a former parking lot that was planned to become a garden – the asphalt had already been torn up, there was no light or electricity and the scenery was very modest and rough. Urban transformation was in progress, so the location of the event gave a strong signal to the community about the change happening in the place.

5.3 Innovativeness

Analysis of the interviews show that combining traditional and innovative gastronomy elements emerged in all selected events, either through experimenting with new recipes, introducing unconventional practices,

combining different technologies or engagement through social media. In this section we're pointing out the elements of innovativeness which were perceived and characterized as such by organizers of the events themselves.

The S was designed as a project which would join the tradition, heritage, habits and social norms with novelty and innovation. Our interviewee explained that they started with collecting the testimonies about culinary heritage and based on that proposed an *»unexpected spectacle with innovative engagement of the spectators«*.

In the case of PRT organizer accentuated that food, cuisine and gastronomy were rarely presented in the museum collections. For some members of the network, this was uncharted territory and an additional reason to participate. What was also innovative was encouraging active participation of the public in traditionally more »watch and listen« environment of historical museums (e.g., a competition for collecting recipes as memories of a childhood in Prussian Palaces and Gardens Foundation Berlin-Brandenburg, Germany or virtual photo competitions held at the network level).

In 25 years, G festival havs been always following latest trends in gastronomy and looking for innovative approaches to present them to public. To this end they have placed chefs in front of an audience, on the cooking stage, promoted the unconventional uses of traditional products, and diversified the program by introducing new accompanying activities, mainly artistic performances and projects with community (*menu gastronomad*; cooking competition of grandparent-grandchild pairs; workshops in disadvantaged communities).

5.4 Creativity

In our study cases, creativity is primarily exhibited through the inclusion of artistic activities on the program. S, for example, is in its core also an artistic project (*»the art of five senses«*), creating theatre pieces based on field exploration in different countries. Music is important feature of R&C workshops, where in addition to cooking participants also perform together in improvised jam sessions. Organisers of the G festival are mixing the art of cooking with other genres of art such as music, comics, photography or plastic arts. Event is rooted in wider cultural movement of the city of Angoulême, which is known for its lively festival activities. It hosts several prominent festivals throughout the year: International Comics Festival in January, the Musiques Métisses festival in May, the Francophone Film Festival in August, the Piano en Valoi festival in October and Les Gastronomades in November. Accompanying artistic program was stated to be important feature also in E and numerous PRT events.

5.5 Tolerance and openness

In observed gastronomy events, contribution to the tolerance and openness of the place is threefold: inclusion of different social groups, intergenerational exchange and personal enrichment.

In R&C workshops the main target audience were local residents in 14th arrondissement in Paris and the refugees living there. Main objective of the organizers was helping refugees to integrate in their hosting community and diminishing stigmatization they are subjected to. The event was advertised on the social media platforms of three organizations involved with refugees and migrants: SINGA Paris, the InFLÉchir Association and the Bureau d'Accueil et d'Accompagnement des Migrants. Working with unprivileged social groups was pointed out also in case of G and S.

Enhancing intergenerational solidarity and exchange is one of the horizontal objectives of G, carried out through different activities for elder people and children e.g., a cooking competition of grandparent-grandchild pairs, and schoolchildren serving meals to the elderly in retirement homes in Angoulême.

Beside learning about other cultures and understanding the generational differences, our studied events put into test also attachment to the personal habits and behavioral patterns. The important component of the E project was thus to challenge existing habits that people have developed around food and feeding. At each event, the participants needed to follow three rules: they had to feed one another, part of the food needed to be fed with the hands and, in order to be able to do this, the participants needed to wash each other's hands before. An interlocutor shared his observations about the participants' reactions: *»There is something ritualistic in washing someone else's hands. The participants started to reflect on what it means*

to give food to other people. You become like a child, or like an older person; you need care and you do it with care.«

5.6 Summary of the analysis of place-making features of gastronomy events and its limitations

After detailed analysis of different place-making implications that gastronomy events can have in their respective communities, we prepared the overview table, showing also whether event is a top-down or bottom-up initiative and which type of social capital it activates.

Adaptation of quality place indicators and their use for the purpose of our analysis turned out to be challenging when making distinction between diversity, creativity and liveliness, and distinction between innovativeness and creativity (the need to be creative in order to innovate; Edwards-Schachter et al. 2015), but despite this we managed to show that gastronomy events exceed their economic potential (when included in tourism offer of the territory), and carry strong potential also for development of local community and make place attractive to live and work in.

Table 3: Overview of place-making implications in analyzed gastronomy events.

	Rhythm & Cook	Les Gastronomades	A Place at the Royal Table	Sonomaton	Ecosistema
Type of event according to Markusen and Gadwa (2010); Rota and Salone (2014)	• Unconventional, bottom- up	• Conventional, top-down	• Conventional, top-down	• Unconventional, bottom-up	• Unconventional, bottom- up
Activation of social capital according to Townley et al. (2011)	• Bonding • Bridging	• Bonding	• Bonding	• Bonding • Bridging	• Bonding
Diversity	• Multi-purpose use of the public spaces • Variety in the content	• Multi-purpose use of the public spaces	• Variety in the content	/	/
Liveliness	• Universal value of cooking as means of communication • Inclusion of entire neighbourhood • Voluntarism	• Part of program dedicated to local community	• Part of program dedicated to local community	• Universal value of cooking as means of communication	• Urban revitalization
Innovativeness	• Combining traditional and innovative gastronomy elements	• Combining traditional and innovative gastronomy elements • Placing chefs in front of an audience • Combining cooking with other activities	• Combining traditional and innovative gastronomy elements • Selection of topics rarely presented in museums	• Combining traditional and innovative gastronomy elements	• Combining traditional and innovative gastronomy elements
Creativity	• Inclusion of artistic activities	• Inclusion of artistic activities	• Inclusion of artistic activities	• Inclusion of artistic activities	• Inclusion of artistic activities
Tolerance, openness	• Inclusion of different social groups	• Inclusion of different social groups • Intergenerational exchange	/	• Inclusion of different social groups	• Personal enrichment

The analysis of events confirms the complicity between art and gastronomy, both being identified as the important creative fields by UNESCO Creative city network initiative for promotion of creativity as a strategic factor for sustainable urban development (Duconseille and Saner 2020).

6 Discussion

In this chapter, we address three aspects emerging from comparison of the gastronomy-based and art-based place-making implications: diversity of initiatives, integration in development policies and the question of replicability.

In parallel with art studies (Rota and Salone 2014; Rembeza 2016), gastronomy initiatives with a place-making impact can be diverse as well. In the five study cases the different spatial levels of the actions were observed: from one neighborhood or one city to the group of locations (either random pop-up locations or already established network of sites). Knowing more about the organizers reveals additional aspect of diversity: in the cases at hand, the initiators are a group of students, a journalist, an interest professional network and artists. They initiated the food events with either completely volunteer or completely financially compensated engagement. Different research findings in previous place-making studies showed that there is no single definition of the community (Thomas, Pate and Ranson 2015; Kullberg et al. 2010), which our study can confirm as well. Similarly to the findings of Salzman and Yerace (2018), we also observed that in more intimate and small-scale events the connection between participants and their reactions to the event are stronger (Rhythm & Cook, Ecosistema and Sonomaton).

Part of our gastronomy events show compliance with the existing public policies and institutional framework in several forms (Šmid Hribar, Razpotnik Visković in Bole 2021): through inclusion in event programming and direct public financial support (Les Gastronomades, Sonomaton) or financing through projects/programs (A Place at the Royal Table). The other two (Rhythm & Cook and Ecosistema) on the other hand indicate that institutional framework and support are not prerequisites for creative place-making (Salzman and Yerace 2018). Both events were spontaneous, based on volunteer engagement of the organizers and with cost-free entrance for participants. Interestingly, both events were recognized also as potentially sellable products, i.e., for team-building activities. This leads us to the next aspect of our cross-cutting analysis: the question of replicability and transferability of different gastronomy event concepts.

Salzman and Yerace (2018) argue that creative place-making must be authentic for the community, and therefore the transfer of successful projects from the original place to another one is paradoxical. In contrast, some of our study cases demonstrate that replicability of the events in different locations (and different communities) is possible, with proper adaptation to changed circumstances (the audience, cooperating partners, expectations and needs of the community, level of openness). For example, the Rhythm & Cook workshops were initially held in the 14th arrondissement in Paris. After the success in their community, the cultural center in the commune of Saint-Ouen-sur-Seine (in the northern suburbs of Paris) sought to organize the same format of the event for their neighborhood, with the same purpose. Ecosistema was also presented in several locations, and each addition demanded adaptation to the physical conditions of the place (a closed space, port or former parking lot under reconstruction), the guests (either invited or coincidental passers-by) or adapting the menu to the selection of local producers. However, the replicability of the royal palaces' project A Place at the Royal Table in other locations would be more challenging: first, because of the context given by the European Year of Cultural Heritage and, second, because of the crucial role played by the management of the network in establishing the framework for defining the content of the activity and coordinating the entire process from the beginning to the end. Our examples thus indicate that some types of gastronomy events (in our cases those are the unconventional events) are more transferable than others (conventional one), and that integration in a broader context, namely policy or public financing, can weaken their replicability potential.

7 Conclusion

The analyzed study cases in this paper demonstrate that gastronomy events can improve the quality of place and can play a significant role of the social catalyst in the community. They also indicate that places are

not only »sceneries« of social interaction and community-building efforts, but also an integral element of these processes. The limited number of studied gastronomy events don't allow us to draw generalized conclusions. Despite that, our analysis can provide valuable insight in place-making potential of gastronomy events beyond the scope of the tourism for urban planning and governance. The most important is the recognition of the place-making potential of unconventional bottom-up initiatives, characterized by the absence of formality which tend to have stronger capacity for activating the bridging social capital, since they evoke multiple communities interacting in ways that are not superficial, but meaningful and purposeful. It is thus our recommendation that city authorities support also these types of initiatives, while researchers dedicate more attention to better understand the replicability of these type of initiatives and investigate the effect of different financial mechanisms on them.

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2 Types of papers

Unsolicited or invited original research papers and review papers are accepted. Papers and materials or sections of them should not have been previously published or under consideration for publication elsewhere. The papers should cover subjects of current interest within the journal's scope.

3 Special issues

The journal also publishes special issues (thematic supplements). Special issues usually consist of invited papers and present a special topic, with an introduction by the (guest) editors. The introduction briefly presents the topic, summarizes the papers, and provides important implications.

4 Peer-review process

All papers are examined by the editor-in-chief. This includes fact-checking the content, spelling and grammar, writing style, and figures. Papers that appear to be plagiarized, are badly or ghost-written, have been published elsewhere, are outside the scope of the journal, or are of little interest to readers of *Acta geographica Slovenica* may be rejected. If the paper exceeds the maximum length, the author(s) must shorten it before the paper is reviewed. The paper is then sent to responsible editors, who check the relevance, significance, originality, clarity, and quality of the paper. If accepted for consideration, the papers are then sent to peer reviewer(s) for double-blind review. Papers are rejected or accepted based on the peer reviews and editorial board's decision.

5 Publication frequency

Acta geographica Slovenica is published three times a year.

6 Open-access policy

This journal provides immediate open access to the full-text of papers at no cost on the principle of open science, that makes research freely available to the public. There is no paper processing fee (Article Processing Charge) charged to authors.

Digital copies of the journal are stored by the repository of ZRC SAZU and the digital department of Slovenian national library NUK, dLib.

The author(s) receive a free print copy. The journal's publication ethics and publication malpractice statement is available online, as well as information on subscriptions and prices for print copies.

AUTHOR GUIDELINES

Before submitting a paper, please read the details on the journal's focus and scope, publication frequency, privacy statement, history, peer-review process, open-access policy, duties of participants, and publication ethics (all available at https://ags.zrc-sazu.si).

1 Types of papers

Unsolicited or invited original research papers and review papers are accepted. Papers and materials or sections of them should not have been previously published or under consideration for publication elsewhere. The papers should cover subjects of current interest within the journal's scope.

2 Special issues

The journal also publishes special issues (thematic supplements). Special issues usually consist of invited papers and present a special topic, with an introduction by the (guest) editors. The introduction briefly presents the topic, summarizes the papers, and provides important implications.

3 The papers

Research papers must be prepared using the journal's template (available at https://ags.zrc-sazu.si) and contain the following elements:

- **Title:** this should be clear, short, and simple.
- **Information about author(s):** submit names (without academic titles), affiliations, ORCiDs, and e-mail addresses through the online submission system (available at https://ags.zrc-sazu.si).
- **Highlights**: authors must provide 3–5 highlights. This section must not exceed 400 characters, including spaces.
- **Abstract:** introduce the topic clearly so that readers can relate it to other work by presenting the background, why the topic was selected, how it was studied, and what was discovered. It should contain one or two sentences about each section (introduction, methods, results, discussion, and conclusions). The maximum length is 800 characters including spaces.
- **Key words:** include up to seven informative key words. Start with the research field and end with the place and country.
- **Main text:** The main text must not exceed 30,000 characters, including spaces (without the title, affiliation, abstract, key words, highlights, reference list, and tables). Do not use footnotes or endnotes. Divide the paper into sections with short, clear titles marked with numbers without final dots: **1 Section title**. Use only one level of subsections: **1.1 Subsection title**.

Research papers should have the following structure:

- **Introduction:** present the background of the research problem (trends and new perspectives), state of the art (current international discussion in the field), research gap, motivation, aim, and research questions.
- **Methods:** describe the study area, equipment, tools, models, programs, data collection, and analysis, define the variables, and justify the methods.
- **Results:** follow the research questions as presented in the introduction and briefly present the results.

- **Discussion:** interpret the results, generalize from them, and present related broader principles and relationships between the study and previous research. Critically assess the methods and their limitations, and discuss important implications of the results. Clarify unexpected results or lacking correlations.
- **Conclusion:** present the main implications of the findings, your interpretations, and unresolved questions, offering a short take-home message.

Review papers (narratives, best-practice examples, systematic approaches, etc.) should have the following structure:

- **Introduction:** include 1) the background; 2) the problem: trends, new perspectives, gaps, and conflicts; and 3) the motivation/justification.
- **Material and methods:** provide information such as data sources (e.g., bibliographic databases), search terms and search strategies, selection criteria (inclusion/exclusion of studies), the number of studies screened and included, and statistical methods of meta-analysis.
- **Literature review:** use subheadings to indicate the content of the various subsections. Possible structure: methodological approaches, models or theories, the extent of support for a given thesis, studies that agree with one another versus studies that disagree, chronological order, and geographical location.
- **Conclusions:** provide implications of the findings and your interpretations (separate from facts), identify unresolved questions, summarize, and draw conclusions.

– **Acknowledgement:** use when relevant. In this section, authors can specify the contribution of each author.
– **Reference list:** see the guidelines below.

4 Paper submission

4.1 Open journal system

Author(s) must submit their contributions through the *Acta geographica Slovenica* Open Journal System (OJS; available at https://ags.zrc.sazu.si) using the Word document template (available at https://ags.zrc.sazu.si).

Enter all necessary information into the OJS. Any addition, deletion, or rearrangement of names of the author(s) in the authorship list should be made and confirmed by all coauthors before the manuscript has been accepted, and is only possible if approved by the journal editor.

To make anonymous peer review possible, the paper text and figures should not include names of author(s).

Do not use contractions or excessive abbreviations. Use plain text, with sparing use of **bold** and *italics* (e.g. for non-English words). Do not use auto-formatting, such as section or list numbering and bullets.

If a text is unsatisfactory, the editorial board may return it to the author(s) for professional copyediting or reject the paper. See the section on the peer-review process (available at https//ags.zrc-sazu.si) for details. Author(s) may suggest reviewers when submitting a paper.

4.2 Language

Papers are published in English.

Papers can be submitted in English or Slovenian.

Authors must take care of high-quality English text. In the case of poor language, the paper is copyedited/translated after acceptance by a professional chosen by the editorial board. In such a case, the translation or copyediting costs are borne by the author(s) and must be paid before layout editing.

All papers should have English and Slovenian abstracts.

4.3 Supplementary file submission

Supplementary files (figures) can be submitted to the OJS packed in one zip file not exceeding 50 MB.

4.4 Submission date

The journal publishes the submission date of papers. Please contact the editorial board (ags@zrc-sazu.si) with any questions.

5 Citations

Examples for citing publications are given below. Using »grey literature« is highly discouraged.

5.1 Citing papers

- Bole, D. 2004: Daily mobility of workers in Slovenia. Acta geographica Slovenica 44-1. DOI: https://doi.org/10.3986/AGS44102
- Fridl, J., Urbanc, M., Pipan, P. 2009: The importance of teachers' perception of space in education. Acta geographica Slovenica 49-2. DOI: https://doi.org/10.3986/AGS49205
- Gams, I. 1994a: Types of contact karst. Geografia Fisica e Dinamica Quaternaria 17.
- Gams, I. 1994b: Changes of the Triglav glacier in the 1955-94 period in the light of climatic indicators. Geografski zbornik 34.
- van Hall, R. L., Cammeraat, L. H., Keesstra, S. D., Zorn, M. 2016: Impact of secondary vegetation succession on soil quality in a humid Mediterranean landscape. Catena, In press. DOI: https://doi.org/10.1016/j.catena.2016.05.021 (25. 11. 2016).
- de Kerk, G. V., Manuel, A. R. 2008: a comprehensive index for a sustainable society: The SSI – the Sustainable Society Index. Ecological Economics 66-2,3. DOI: https://doi.org/10.1016/j.ecolecon.2008.01.029
- Perko, D. 1998: The regionalization of Slovenia. Geografski zbornik 38.
- Urry, J. 2004: The 'system' of automobility. Theory, Culture & Society 21-4,5. DOI: https://doi.org/10.1177%2F0263276404046059
- Yang, D. H., Goerge, R., Mullner, R. 2006: Comparing GIS-based methods of measuring spatial accessibility to health services. Journal of Medical Systems 30-1. DOI: https://doi.org/10.1007/s10916-006-7400-5

5.2 Citing books

- Cohen, J. 1988: Statistical power analysis for the behavioral sciences. New York.
- Fridl, J., Kladnik, D., Perko, D., Orožen Adamič, M. (eds.) 1998: Geografski atlas Slovenije. Ljubljana.
- Hall, T., Barrett, H. 2018: Urban geography. Routledge. DOI: https://doi.org/10.4324/9781315652597
- Hall, C. M., Page, S. J. 2014: The geography of tourism and recreation: Environment, place and space. Routledge.
- Luc, M., Somorowska, U., Szmańda, J. B. (eds.) 2015: Landscape analysis and planning, Springer Geography. Heidelberg. DOI: https://doi.org/10.1007/978-3-319-13527-4
- Nared, J., Razpotnik Visković, N. (eds.) 2014: Managing cultural heritage sites in southeastern Europe. Ljubljana. DOI: https://doi.org/10.3986/9789610503675

5.3 Citing parts of books or proceedings

- Gams, I. 1987: a contribution to the knowledge of the pattern of walls in the Mediterranean karst: a case study on the N. island Hvar, Yugoslavia. Karst and Man, Proceedings of the International Symposium on Human Influence in Karst. Ljubljana.
- Hrvatin, M., Perko, D., Komac, B., Zorn, M. 2006: Slovenia. Soil Erosion in Europe. Chichester. DOI: https://doi.org/10.1002/0470859202.ch25
- Komac, B., Zorn, M. 2010: Statistično modeliranje plazovitosti v državnem merilu. Od razumevanja do upravljanja, Naravne nesreče 1. Ljubljana.
- Zorn, M., Komac, B. 2013: Land degradation. Encyclopedia of Natural Hazards. Dordrecht. DOI: https://doi.org/10.1007/978-1-4020-4399-4_207

5.4 Citing expert reports, theses, and dissertations

- Breg Valjavec, M. 2012: Geoinformatic methods for the detection of former waste disposal sites in karstic and nonkarstic regions (case study of dolines and gravel pits). Ph.D. thesis, University of Nova Gorica. Nova Gorica.

- Holmes, R. L., Adams, R. K., Fritts, H. C. 1986: Tree-ring chronologies of North America: California, Eastern Oregon and Northern Great Basin with procedures used in the chronology development work including user manual for computer program COFECHA and ARSTAN. Chronology Series 6. University of Arizona, Laboratory of tree-ring research. Tucson.
- Hrvatin, M. 2016: Morfometrične značilnosti površja na različnih kamninah v Sloveniji. Ph.D. thesis, Univerza na Primorskem. Koper.
- Šifrer, M. 1997: Površje v Sloveniji. Elaborat, Geografski inštitut Antona Melika ZRC SAZU. Ljubljana.

5.5 Citing online material with authors and titles

- Bender, O., Borsdorf, A., Heinrich, K. 2010: The interactive alpine information system GALPIS. Challenges for mountain regions, Tackling complexity. Internet: http://www.mountainresearch.at/images/Publikationen/Sonderband/bender-borsdorf-heinrich.pdf (4. 8. 2014).

5.6 Citing online material without authors

- Internet 1: http://giam.zrc-sazu.si (18. 11. 2016).
- Internet 2: http://ags.zrc-sazu.si (23. 7. 2012).
- Internet 3: https://www.sgi-network.org/2020/ (14. 2. 2021).

5.7 Citing sources without authors

- Housing standards, Slovenia, multiannually. Statistical Office of the Republic of Slovenia. Internet: https://pxweb.stat.si/SiStatData/pxweb/en/Data/-/H151S.px (14. 2. 2021).
- Popis prebivalstva, gospodinjstev, stanovanj in kmečkih gospodarstev v Republiki Sloveniji, 1991 – končni podatki. Zavod Republike Slovenije za statistiko. Ljubljana, 1993.
- WCED – World commission on environmental and development: Our common future – Brundtland report. Oxford, 1987.

5.8 Citing cartographic sources

- Buser, S. 1986: Osnovna geološka karta SFRJ 1 : 100.000, list Tolmin in Videm (Udine). Savezni geološki zavod. Beograd.
- Digitalni model višin 12,5. Geodetska uprava Republike Slovenije. Ljubljana, 2005.
- Državna topografska karta Republike Slovenije 1 : 25.000, list Brežice. Geodetska uprava Republike Slovenije. Ljubljana, 1998.
- Franciscejski kataster za Kranjsko, k. o. Sv. Agata, list A02. Arhiv Republike Slovenije. Ljubljana, 1823–1869.
- The vegetation map of forest communities of Slovenia 1 : 400,000. Biološki inštitut Jovana Hadžija ZRC SAZU. Ljubljana, 2002.

5.9 Citing official gazettes

- 1999/847/EC: Council Decision of 9 December 1999 establishing a Community action programme in the field of civil protection. Official Journal 327, 21. 12. 1999.
- Zakon o kmetijskih zemljiščih. Uradni list Republike Slovenije 59/1996. Ljubljana.
- Zakon o varstvu pred naravnimi in drugimi nesrečami. Uradni list Republike Slovenije 64/1994, 33/2000, 87/2001, 41/2004, 28/2006 in 51/2006. Ljubljana.

5.10 In-text citations

Please ensure that every reference cited in the text is also in the reference list (and vice versa). In-text citations should state the last name of the author(s) and the year, separate individual citations with semicolons, order the quotes according to year, and separate the page information from the name of the author(s) and year information with a comma; for example: (Melik 1955), (Melik, Ilešič and Vrišer 1963; Kokole 1974, 7–8; Gams 1982a; Gams 1982b).

For sources with more than three authors, list only the first followed by *et al.*: (Melik et al. 1956). Cite page numbers only for direct citations: Perko (2016, 25) states: »Hotspots are …« To cite online material with authors, cite the name: (Zorn 2010). To cite online material without authors, cite only Internet followed by a number: (Internet 2).

5.11 Works cited list

Arrange references alphabetically and then chronologically if necessary. Identify more than one reference by the same author(s) in the same year with the letters *a*, *b*, *c*, etc., after the year of publication: (1999a; 1999b). Use this format for indirect citations: (Gunn 2002, cited in Matei et al. 2014).

Include the Digital Object Identifier (DOI) in the reference if available. Format the DOI as follows: https://doi.org/… (for example: https://doi.org/10.3986/AGS.1812).

6 Tables and figures

Number all tables in the paper uniformly with their own titles. The number and the text are separated by a colon, and the caption ends with a period. Example:

Table 1: Number of inhabitants of Ljubljana.

Table 2: Changes in average air temperature in Ljubljana (Velkavrh 2009).

Tables should contain no formatting and should not be too large; it is recommended that tables not exceed one page.

Upload figures to the OJS as separate supplementary files in digital form. If the graphic supplements prepared cannot be uploaded using these programs, consult the editorial board (ags@zrc-sazu.si) in advance.

Number all figures (maps, graphs, photographs) in the paper uniformly with their own titles. Example:

Figure 1: Location of measurement points along the glacier.

All graphic materials must be adapted to the journal's format. Illustrations should be exactly 134 mm wide (one page) or 64 mm wide (half page, one column), and the height limit is 200 mm.

To make anonymous peer review possible, include the name of the author(s) with the title of the illustration in the supplementary file metadata, but not in the paper text.

Maps should be made in digital vector form with Corel Draw, Adobe Illustrator, or a similar program, especially if they contain text. They can exceptionally be produced in digital raster form with at least 300 dpi resolution, preferably in TIFF or JPG format. For maps made with *CorelDraw* or *Adobe Illustrator*, two separate files should be prepared; the original file (.cdr or .ai format) and an image file (.jpg format).

For maps made with ArcGIS with raster layers used next to vector layers (e.g., .tif of relief, airborne or satellite image), three files should be submitted: the first with a vector image without transparency together with a legend and colophon (export in .ai format), the second with a raster background (export in .tif format), and the third with all of the content (vector and raster elements) together showing the final version of the map (export in .jpg format).

Do not print titles on maps; they should appear in a caption.

Save colors in CMYK, not in RGB or other formats.

Use Times New Roman for the legend (size 8) and colophon (size 6). List the author(s), scale, source, and copyright in the colophon. Write the colophon in English (and Slovenian, if applicable). Example:

Scale: 1:1,000,000
Content by: Drago Perko
Map by: Jerneja Fridl
Source: Statistical Office of the Republic of Slovenia 2002
© 2005, ZRC SAZU Anton Melik Geographical Institute

Graphs should be made in digital form using *Excel* on separate sheets and accompanied by data.

Photos must be in raster format with a resolution of 240 dots per cm or 600 dpi, preferably in .tif or .jpg formats; that is, about 3,200 dots per page width of the journal.

Figures containing a screenshot should be prepared at the highest possible screen resolution (Control Panel\All Control Panel Items\Display\Screen Resolution). The figure is made using Print Screen, and the captured screen is pasted to the selected graphic program (e.g., *Paint*) and saved as .tif. The size of the image or its resolution must not be changed.

Examples of appropriate graphic data forms: see the templates of maps in cdr and mxd files (available at https://ags.zrc.sazu.si) for a whole-page map in landscape view and an example of the correct file structure (available at https://ags.zrc.sazu.si) for submitting a map made with *ESRI ArcGIS*.

SUBMISSION PREPARATION CHECKLIST

As part of the submission process, authors are required to check off their submission's compliance with all of the following items, and submissions may be returned to authors that do not adhere to these guidelines.

- I, the corresponding author, declare that this manuscript is original, and is therefore based on original research, done exclusively by the authors. All information and data used in the manuscript were prepared by the authors or the authors have properly acknowledged other sources of ideas, materials, methods, and results.
- Authors confirm that they are the authors of the submitting paper, which is under consideration to be published (print and online) in the journal *Acta geographica Slovenica* by Založba ZRC, ZRC SAZU.
- All authors have seen and approved the paper being submitted.
- The submission has not been previously published, nor it is under consideration in another journal (or an explanation has been provided in Comments to the Editor). Authors have disclosed any prior posting, publication or distribution of all or part of the manuscript to the Editor.
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- All the necessary permits to work with people have been obtained in the research related to the paper (in accordance with the applicable laws and institutional guidelines and approved by the relevant institutions).
- The journal policies and guidelines have been reviewed and followed.
- The metadata (title, abstract, key words, authors, affiliation, ORCiD, etc.) are provided in English (Slovenian authors must provide the metadata also in Slovenian language).
- The submission is in Microsoft Word format and the document template was used (single-spaced text, 12-point font, no formatting except italics and bold).
- The paper has been checked for spelling and grammar.
- Figures are not embedded in the Word file and are provided as a supplementary file: editable vector format (e.g., cdr, ai) for maps and illustrations; tif for photographs; xlsx for graphs. The Word file includes only figure captions.
- Tables are placed in the Word file with text at the appropriate place.
- The reference list was prepared following the guidelines.
- All references in the reference list are cited in the text, and vice versa.
- Where available, URLs and DOI numbers for references are provided.
- Supplementary files are in one .zip file.
- I agree that any costs of English proofreading are borne by the author(s). No additional costs are associated with the submission.
- The instructions for ensuring a double-blind review have been followed.

ACTA GEOGRAPHICA SLOVENICA EDITORIAL REVIEW FORM

This is a review form for editorial review (version 13) of a paper submitted to the AGS journal.

This is an original scientific paper.
(The paper is original and the first presentation of research results with the focus on methods, theoretical aspects or a case study.)

- Yes
- No

The paper follows the standard IMRAD/ILRAD scheme.

- Yes
- No

The paper's content is suitable for reviewing in the AGS journal.
(The paper is from the field of geography or related fields of interest, the presented topic is interesting for the readers of *Acta geographica Slovenica* and well presented. In case of negative answer add comments below.)

- Yes
- No

Editorial notes regarding the paper's content.

The reference list is suitable (the author cites previously published papers with similar topics from other relevant geographic scientific journals).

- Yes, the author cited previously published papers on a similar topic.
- No, the author did not cite previously published papers on a similar topic.

Notes to editor-in-chief regarding previously published scientific work.

Is the language of the paper appropriate and understandable?

RECOMMENDATION OF THE EDITOR

- The paper is accepted and can be sent to the review process.
- Reconsider after a major revision (see notes).
- The paper is rejected.

ACTA GEOGRAPHICA SLOVENICA REVIEW FORM

This is *Acta geographica Slovenica* review form (version 6).

1 RELEVANCE

Are the findings original and the paper is therefore a significant one?

- yes
- no
- partly

Is the paper suitable for the subject focus of the AGS journal?

- yes
- no

2 SIGNIFICANCE

Does the paper discuss an important problem in geography or related fields?

- yes
- no
- partly

Does it bring relevant results for contemporary geography?

- yes
- no
- partly

What is the level of the novelty of research presented in the paper?

- high
- middle
- low

3 ORIGINALITY

Has the paper been already published or is too similar to work already published?

- yes
- no

Does the paper discuss a new issue?

- yes
- no

Are the methods presented sound and adequate?

- yes
- no
- partly

Do the presented data support the conclusions?

- yes
- no
- partly

4 CLARITY

Is the paper clear, logical and understandable?

- yes
- no

If necessary, add comments and recommendations to improve the clarity of the title, abstract, keywords, introduction, methods or conclusion:

5 QUALITY

Is the paper technically sound? (If not, the author should discuss with the Editorial Board [ags@zrc-sazu.si] for assistance.)

- yes
- no

Does the paper take into account relevant current and past research on the topic?

- yes
- no

Propose amendments, if no is selected:

Is the references list at the end of the paper adequate?

- yes
- no

Propose amendments, if no is selected:

Is the quoting in the text appropriate?

- yes
- no
- partly

Propose amendments, if no is selected:
Which tables are not necessary?
Which figures are not necessary?

COMMENTS OF THE REVIEWER

Comments of the reviewer on the contents of the paper:
Comments of the reviewer on the methods used in the paper:

RECOMMENDATION OF THE REVIEWER TO THE EDITOR-IN-CHIEF

Please rate the paper from 1 [low] to 100 [high] (this will NOT be presented to the author):
Personal notes of the reviewer to the editor-in-chief (this will NOT be presented to the authors):

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No honoraria are paid for papers in *Acta geographica Slovenica* or for the reviews.

The first author of the paper shall receive one free copy of the publication.

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By submitting their papers or other contributions the authors and reviewers consent to collection and processing of their personal data (like name, surname and email address) which enable effective communication, editing and publication of papers or other contributions.

The names and e-mail addresses provided to this journal site will be used exclusively for the stated purposes of this journal and will not be made available for any other purpose or to any other party.

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JOURNAL HISTORY

Acta geographica Slovenica (print version: ISSN: 1581-6613, digital version: ISSN: 1581-8314) was founded in 1952. It was originally named *Geografski zbornik / Acta geographica* (print ISSN 0373-4498, digital ISSN: 1408-8711). Altogether 42 volumes were published. In 2002 *Geographica Slovenica* (ISSN 0351-1731, founded in 1971, 35 volumes) was merged with the journal.

Since 2003 (from volume 43 onward) the name of the joint journal has been *Acta geographica Slovenica*. The journal continues the numbering system of the journal *Geografski zbornik / Acta geographica*.

Until 1976, the journal was published periodically, then once a year, from 2003 twice a year and from 2019 three times a year.

The online version of the journal has been available since 1995. In 2013, all volumes of the magazine were digitized from the beginning of its publication to 1994 inclusive.

All papers of the journal are available free of charge in digital form on the journal website http://ags.zrc-sazu.si.

Those interested in the history of the journal are invited to read the paper »The History of *Acta geographica Slovenica*« in volume 50-1.

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