

AN OUTSTANDING CULTURAL KARST LANDSCAPE: TERRACED LANDSCAPE FEATURES AND STRENGTHENING THE NATURAL AND CULTURAL VALUES OF THE KARST PLATEAU

Ljubo LAH

University of Ljubljana, Faculty of architecture, Zoisova 12, 1000 Ljubljana, Slovenia
e-mail: ljubo.lah@fa.uni-lj.si

Lucija AŽMAN MOMIRSKI

University of Ljubljana, Faculty of architecture, Zoisova 12, 1000 Ljubljana, Slovenia
e-mail: lucija.azman@fa.uni-lj.si

ABSTRACT

Despite the activities of various civil associations, initiatives, and partnerships, the outstanding cultural landscape of the Karst Plateau is often endangered. In particular, it is threatened by a lack of awareness among its inhabitants and financial pressure, to which local communities react inappropriately considering their communication, spatial planning, and development policies. In addition, the mediation and operation of responsible national institutions are often ineffective. This discussion focuses on the elements of terraced karst landscapes, which differ in their development and characteristics from other terraced landscapes in Slovenia. Their individual and fundamental nature, and the most important features that distinguish such landscapes, are examined in the cadastral municipality of Merče, which is part of the Municipality of Sežana. As a signatory to the European Landscape Convention, Slovenia is committed to its outstanding landscapes, including its terraced karst landscapes, to establish and implement landscape policies aimed at landscape protection, management, and planning through the adoption of specific measures. The first step toward this objective is to raise awareness of its existence; that is, through a precise inventory of this landscape throughout the karst area.

Keywords: terraced landscapes, identity, outstanding landscapes, inventory, Karst Plateau, natural values, cultural values

PAESAGGIO CULTURALE CARSICO DI ECCEZIONALE VALORE: ELEMENTI DI PAESAGGIO TERRAZZATO E MIGLIORAMENTO DEI VALORI NATURALISTICI E CULTURALI DEL CARSO

SINTESI

Nonostante le attività di varie associazioni civili, iniziative e partnership, l'eccezionale paesaggio culturale carsico viene spesso messo in pericolo. In particolare esso è minacciato da una mancanza di consapevolezza tra gli abitanti e dalla pressione del capitale speculativo a cui le comunità locali reagiscono in modo inappropriato sia con la comunicazione che con la pianificazione territoriale e di sviluppo. Inoltre, la mediazione e il funzionamento delle istituzioni statali responsabili è spesso inefficace. Nella discussione ci concentriamo sugli elementi dei paesaggi carsici terrazzati, che differiscono per sviluppo e caratteristiche dagli altri paesaggi terrazzati in Slovenia. La sua natura individuale e fondamentale e le sue caratteristiche più importanti, che ne fanno quello che è, sono verificate nel comune catastale di Merče, che fa parte del comune di Sežana. La Slovenia, firmataria della Convenzione europea sul paesaggio, si impegna a favore dei suoi paesaggi eccezionali, compresi i paesaggi carsici terrazzati, "a stabilire e attuare politiche paesaggistiche volte alla tutela, alla gestione e alla pianificazione del paesaggio attraverso l'adozione di misure specifiche". Il primo passo verso questo obiettivo è quello di aumentare la consapevolezza della sua esistenza, vale a dire un inventario preciso di questo paesaggio in tutta l'area carsica.

Parole chiave: paesaggi terrazzati, identità, paesaggi eccezionali, inventario, Carso, valori naturalistici, valori culturali

INTRODUCTION: OUTSTANDING FEATURES OF THE KARST CULTURAL LANDSCAPE

The Karst Plateau is a limestone landscape between the Gulf of Trieste to the southwest and the Friulian lowlands to the northwest. Various sources define the boundary of the plateau in terms of gravel, geography, landscape, nature, and other elements. To the north it is bordered by the flysch rock of the Vipava Valley, and to the southeast the plateau merges into the Reka Valley and the flysch Brkini and Istria hills. The Karst Plateau is about 60 km long and between 15 and 20 km wide, and

it reaches an elevation between 200 and 600 m. It covers an area of approx. 850 km², of which approximately 550 km² is in Slovenia and the rest in neighboring Italy (Figure 1). Its basic characteristic is that the landscape lacks large and constant surface waters. Precipitation sinks into the limestone terrain and creates a variety of surface and subterranean geomorphological karst features. The Karst Plateau is an important part of the extremely diverse landscape types of Slovenia (Figure 2). This variety and the transitional nature of Slovenia's regions constitute its main geographic characteristic and are important elements of its identity (Ažman Momirski, 2019).

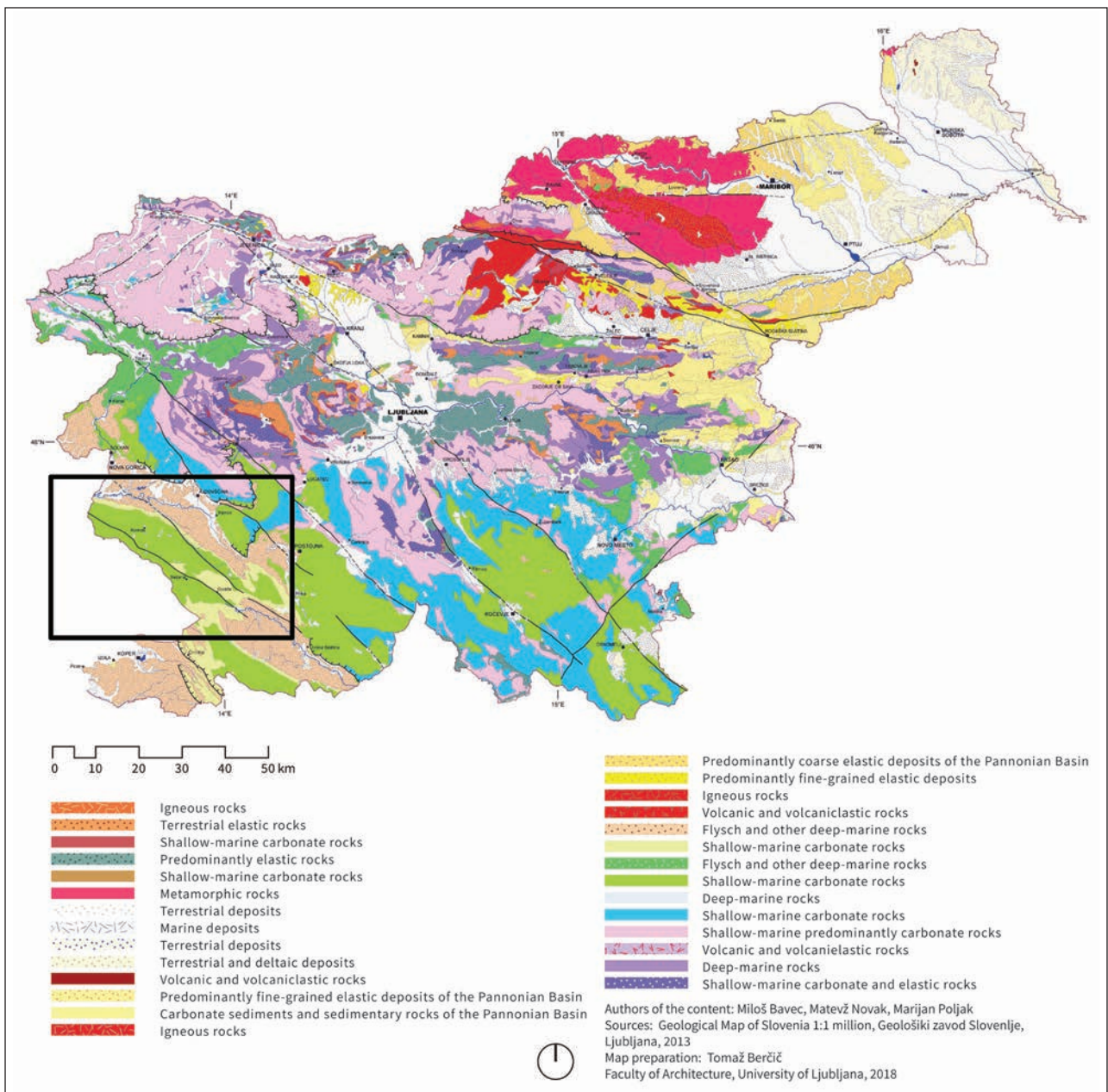


Figure 1: Geological map of Slovenia and the Karst Plateau.

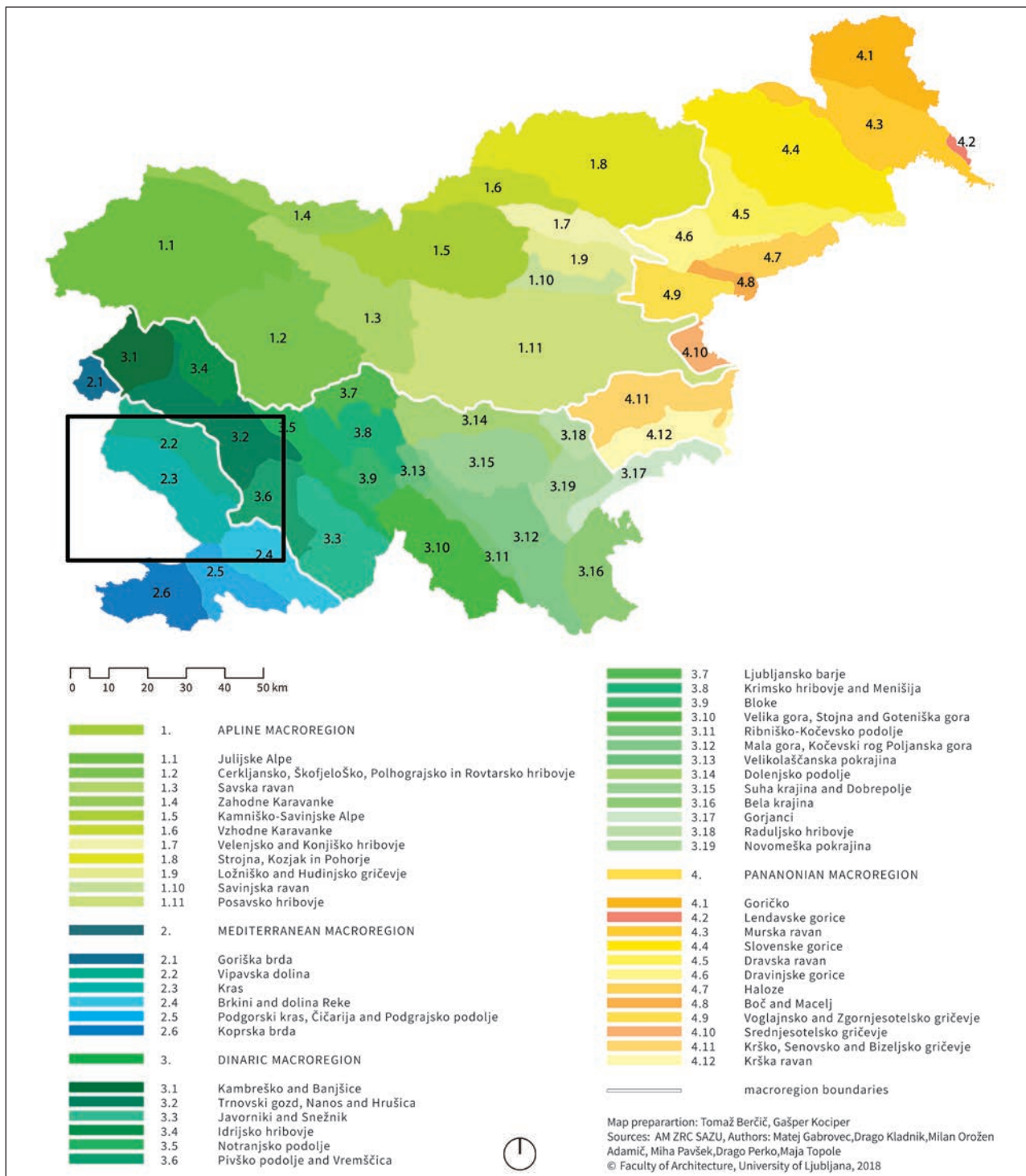


Figure 2: Landscape types of Slovenia and the Karst Plateau.

To date, more than 1,500 cave formations with an average density of two caves per square kilometer and locally as many as forty caves per square kilometer have been discovered in the Karst Plateau area. The longest cave complex is Škocjan Caves and Snake

Cave (*Kačna jama*), which has a length of more than 20 km. The subterranean Reka River, which flows through both cave systems, has formed an extraordinary underground water network under the entire plateau.

The Karst Plateau has unique terrain forms and landscape elements. At the European and global levels, the plateau is best known for its geographical characteristics: it is known for its caves and areas with extremely permeable rock. At the same time, the Karst Plateau—like Tuscany and Provence, for example—has a growing profile as a cultural landscape with a preserved natural and cultural heritage and its own identity. The addition of part of the karst landscape—Škocjan Caves—to the UNESCO World Cultural and Natural Heritage list testifies to the uniqueness and outstanding universal value of this landscape. This occurred in 1986. The wider geographical area, known as the Classical Karst—the karst landscape in a triangle covering the area between the edge of the Ljubljana Marsh, the Gulf of Trieste, and Lake Cerknica—has been on the tentative list of UNESCO World Heritage Sites since 1994. In 2015 Slovenia revised and supplemented its nomination in the natural heritage category (UNESCO Tentative Lists, 2018). The uniqueness of the plateau is specified in national strategic documents. It is emphasized by important national and independent institutions.

In the past, the landscape also played a pioneering role in the naming of karst phenomena: not only with word *karst* (related to Sln. *kras*), which has become an international term, but also with numerous Slavic expressions for karst phenomena sometimes used in international karst terminology: the karst field or *polje* (Sln. *polje*, Germ. *Karstfeld* / *Karstbecken* / *Polje*, Span. *campo kárstico* / *poljé*, French. *bassin karstique* / *poljé*), the sinkhole or *doline* (Sln. *vrtča* / *dolina*, Germ. *Sinkhöhle* / *Doline*, Span. *Torca* / *doline*, French. *effondrement karstique* / *doline*), the solution valley or *uvala* (Sln. *uvala*, Germ. *Karstsenke* / *Uvala*, Span. *depresión karstica* / *uvala*, French *dépression karstique* / *uvala*), and the swallow hole or *ponor* (Sln. *ponor*, Germ. *Karstrichter* / *Ponor*, Span. *Sumidero* / *pónor*, French. *perte* / *ponor*; Gams, 1995; Kranjc, 1994, 1997). Adolf Schmidl (1854) even mentions in his work on the Karst Plateau the typical orographical form of the “terraced karst mountains,” which is also characteristic of Istria and Dalmatia (Kranjc, 1994, 133).

Although the Karst Plateau is threatened by the construction of numerous “satellite settlements,” Slovenia’s National Council characterized the plateau as a particularly valuable landscape (June 16th, 2008) during the conference Preservation of the Karst Landscape as a Development Opportunity for the Karst. An expert survey was conducted to gather information about the current situation on the plateau and to formulate positions and recommendations for the work of the national authorities and municipalities. At that time, the National Council emphasized, among other things, that the plateau as a natural and cultural landscape should be protected both at the national level and in cooperation with the municipalities. Protections are also guaranteed by the Nature Conservation Act and

the European Landscape Convention, which Slovenia is a party to (Conservation of the Karst Landscape as a Development Opportunity of the Karst: A Collection of Contributions and Debates, 2008).

The Slovenian Academy of Sciences and Arts’ Council for Culture and Spatial Identity of Slovenia, which emphasized in its declaration that the Karst Plateau is an ecologically extremely vulnerable landscape, also reacted (Luthar et al., 2008). Depending on the correct use of the land, it is also up to people whether they can preserve today’s diversity above all in the subsoil, in biodiversity, and in geological and geomorphological heterogeneity. Interestingly, the Forum 21 Society for Political, Economic, Developmental, Social, Cultural, and Ethical Issues also dealt with spatial, nature conservation, economic, and demographic issues of Karst Plateau development. As an independent civil society institution, it supported the idea of reviving the development project of the Karst Regional Park to protect the Karst Plateau and accelerate its addition to the UNESCO list. Under special conditions, the development of economic and other activities and the improvement of living conditions and opportunities for the local population within the park would be made possible.

RESEARCH PROBLEM: WHAT THREATENS THE KARST CULTURAL LANDSCAPE AND ITS IDENTITY?

Identity is a contradictory notion: it refers to both the condition of being the same or exactly alike—that is, sameness and oneness (e.g., groups united by identity of interests)—and the condition or fact of being a specific person or thing; that is, individuality. Its meaning is linked to the essence, fundamental nature, or most important quality that makes something what it is (Loeper et al., 2016).

It is important to be aware that most damage and irreversible consequences to nature on the Karst Plateau are caused by man. There is an extraordinary density of surface and subterranean karst phenomena—constituting natural heritage, extraordinary geological heritage, and abiotic, biotic, and scenic diversity of the typical karst landscape. To preserve the natural and manmade values of this area in a rather densely populated cultural landscape (the Municipality of Sežana has 111 inhabitants per km²), the Karst Plateau must especially be protected against inappropriate spatial changes, against inappropriate use and practices, and against more recent phenomena in which the capital market itself dictates and controls spatial development. Only with an active and development-oriented approach can the plateau also be protected in the long term in line with nature conservation criteria.

The spatial degradation of the Karst Plateau is only one of the problems that have recently been so strongly expressed that they are also perceived by the general public. In recent decades, the greatest damage has been

Table 1: Comparison of vineyards located on terraces in nine wine districts in Slovenia and their shrinkage data (Sources: for 2007: Škvarč & Kodrič, 2007; for 2011: Mavrič Štrukej et al., 2014; for 2016: RPGV).

Wine districts	2007 (ha)	2011 (ha)	2016 (ha)	Vineyards on terraces: shrinkage (ha)	Vineyards on terraces: shrinkage (%)
Prekmurje	4	4	2	2	50%
Styria	35	24	21	14	40%
Bizeljsko-Sremič	42	34	27	15	36%
Lower Carniola	27	18	15	12	44%
White Carniola	27	23	20	7	26%
Gorizia Hills	81	80	80	1	1%
Vipava Valley	66	65	59	7	11%
Karst Plateau	14	13	10	4	29%
Slovenian Istria	30	21	20	10	33%

caused by the greed and indifference of investments and by professional self-assertion and ignorance. In recent decades, new housing units, row housing, blocks, towers, and industrial and commercial areas have encroached into areas that used to be agricultural land: meadows, pastures, and also vineyards. Construction activity is strongly linked to degradation in the form of a large number of landfills and excavations, which is usually even more difficult to control and prevent. Dry-stone-walled field paths have suddenly become paved streets in sparsely populated areas with new buildings. Typical housing projects with different backgrounds and adapted to the wishes, tastes, and knowledge (or ignorance) of self-builders have served as a basis for construction. On the other hand, individual architects are becoming increasingly aware of the tendency to create architecture that should be completely freed from traditions and identity features, which in turn leads to the artistic and design degradation of space.

A number of planned satellite settlements around the nuclei of Karst Plateau villages and even in a prestigious location in the immediate vicinity of the Lipica Stud Farm protected area have posed a serious threat to the plateau as a natural and national value and to the cultural identity of the plateau from both a landscape and architectural point of view.

With the opening of the border with Italy, the Slovenian part of the Karst Plateau became even more attractive. Obsolete but still valid spatial planning and implementation laws of the municipalities in the area opened the door for new forms of spatial development and the actual abuse of the area as a territorial capital, which the plateau has with its preserved natural and cultural heritage. For the first time in the history of the plateau (as in Slovenia), the spatial development of rural villages determined the interests of capital and power by developers (these were actually in the role of intermediaries

of bank capital). This type of interest in construction mainly focused on improving capital injections, which was to be represented by new building units in satellite settlements. These are to be offered on the open property market. The planned interventions did not, of course, arise from the well-founded needs of local communities or the local population. On the contrary, the local population was distant from important decisions on the further spatial development of their settlements and the entire plateau. In addition, demographic analyses and other forecasts that the initiator of the changes should prepare did not justify and do not justify the planned interventions (Lah, 2008, 14).

On the Karst Plateau there are four recognized landscape areas, five outstanding landscapes, numerous protected areas, and numerous areas of natural values. The area is an ecologically important area. The most important agricultural activity on the plateau is viticulture (MOP, 2013; Figure 3). Compared to Slovenia's eight other wine-growing districts, in 2016 vineyards on terraces covered only 10 ha of land, which is just over 4% of the terraced vineyards in Slovenia (Table 1). Studies define the karst landscape as unique because of its diversity, its high experience value, and its special features described earlier (Panjek, 2015). In the past, land use was predominantly pasture, and today—like elsewhere in Slovenia—the landscape is increasingly wooded. The landscape is characterized by dry stone enclosures that protect the soil from wind erosion and prevent livestock from escaping, as well as marking borders at the edges of plots, meadows, and fields.

In historical sources, one can find evidence of the desolated karst landscape, where the farmers obtained new land by adapting the terrain to cultivation through clearing stones (Dorsi, 1989) that were later used to build enclosures. The descriptions agree that the karst soil is rocky, with a thin layer of soil and thus with

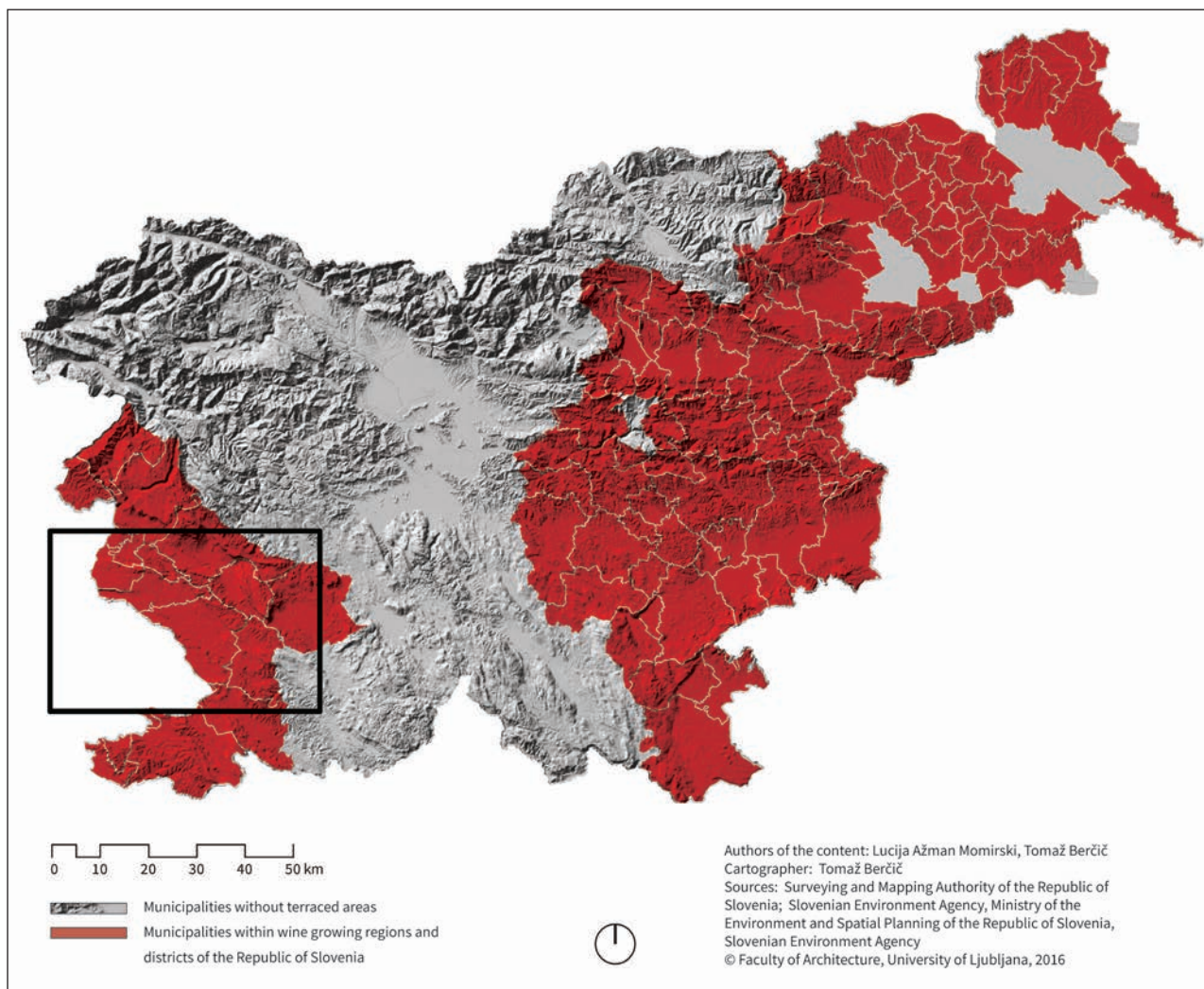


Figure 3: Municipalities with terraced vineyards in Slovenia and the Karst Plateau.

small areas of cultivated land where anything is cultivated that can possibly be cultivated under such conditions. Fertile karst land is found only in the Sežana area. Rocky karst, or half-bare and bare karst, is not only a natural phenomenon, but above all the work of man (Gams, 1991; Radinja, 1987a). A patchwork carpet of these efforts is recognized in piles of rocks, escarpments, and walls. Due to their geomorphological properties, karst terrain is particularly exposed to the erosion effects of climatic factors such as wind, rain, snow, and ice. Unmitigated deforestation has aggravated this type of microclimate condition (Gams, 1991, 6):

When adapting the rocky or semi-bare originally wooded Littoral Dinaric Karst for pastures, the peasants used to burn the forest. To make meadows, they removed stones from the surface, and to prepare land for ploughing they also removed

them from the soil. For growing grapevines and fruit trees, they had to remove stones to a depth of half a meter or more. The forms of accumulated rubble were related to the intensity of clearing rock. The intended land use and shapes of accumulated cleared stones (or rubble) form a system that has been changing over the course of time.

In the immediate vicinity of the settlements there were gardens, fields, and meadows. The slopes are characterized by low terrace walls without binders such as mortar or cement. The dry stone wall was also referred to as a karst wall (Radinja, 1987b). For agricultural purposes, cultivating the soil of fields in sinkholes is more natural because soil is collected in them.

Authors speak about agricultural karst landscapes (Fr. *paysages agro-karstiques*; Nicod, 1987, 108–110), which are characterized by stone walls and cultivated terraces (Lago, 1994; Nicod, 1992).

Terraced landscapes are often bearers of spatial identity throughout the world, including in other geographical areas of Slovenia (e.g., in the Jeruzalem Hills, the Gorizia Hills, and elsewhere). A terraced landscape contributes to the identity and profile of local cultures. It is an important part of people's quality of life, and it ensures diversity and makes the region attractive, thus preserving settlements and the vitality of rural areas (Ažman Momirski, 2008a, 2008b, 2008c, 2008d). In this context, terraces are often recognized as important landscape elements. Hudoklin (2008) identified terraced landscapes as areas of landscape identity that are changing significantly in some parts of Slovenia. On the other hand, terraces of low or medium importance are very common in Slovenia.

Identity also plays a role in reestablishing the connection with the "land of the fathers." In many cases, young people are returning to forgotten farms inherited from their parents. This connection, however, does not only refer to possession, but can also describe affiliation acquired through care for the land. This search for identity does not lead to easy land preservation (Varotto et al., 2019). Terraces are perceived as part of the identity of the Ligurian landscape; in this area, Cinque Terre National Park is the most representative image. Multidimensional effects (or costs) of land abandonment in terraced landscapes are a loss of cultural identity and cultural diversity. Important multidimensional services of the ecosystem in terraced landscapes are cultural identity and sense of place. The olive is the emblematic tree of the Mediterranean region. In addition to viticulture and grain cultivation, growing olives is the most traditional agricultural activity, and the most striking feature of its agricultural landscape is characteristic of the Mediterranean landscape (Loumou, Giourga, 2003). Place identity is also the critical parameter in the direction and dynamics of the tourism impact (Terkleani, 1991).

Today, the balance between built-up areas and the environment is increasingly shifting toward the edge of the open landscape. It is therefore necessary to examine whether the identity of the built environment can also be created by the external coherent network of settlement and landscape areas (Loeper et al., 2016). The identity of a region is rooted in both built-up areas and the landscape. The Landscapes of the World Heritage List (Cultural Landscapes, 2015) are cultural landscapes that are part of our collective identity and they are protected because they illustrate the evolution of human society and settlement over time.

Hypothesis

The analytical review of terraced landscapes in Slovenia so far (Ažman Momirski, Kladnik, 2009; Ažman Momirski, 2019) must be added the work defining the terraced landscape of the Karst Plateau. Radinja (1987a, b) focuses, among other things, on research on karst dry

stone walls, which mostly support terraced slopes in the karst region. Gams (1991) also highlights terraced areas in other geographical areas, such as in Croatia (e.g., a deteriorating terraced landscape below the village of Meja above the main coastal road from Rijeka to Kraljevica on the edge of the Bay of Bakar). Panjek (2015) has recently provided what is probably the most comprehensive insight into the terraced karst landscape.

The karst terraced landscape is certainly exceptional and it differs considerably from other Slovenian terraced landscapes in terms of its origins and causes, so that, like other spatial elements of the karst region, it should be treated with caution and thorough understanding. If its true characteristics are clearly known, it will be easier to add values and a future to this cultivated and maintained land. The main identification problem is a correct inventory, without which one cannot determine the characteristics of the terraced landscape.

METHODOLOGY AND DATA

Selecting various methodologies was necessary for the purposes and aims of this research. The methodology for identifying terraced landscapes is based on various criteria (Ažman Momirski, 2019). Diverse types of terraces exist within Slovenia's terraced landscapes, but they are all made up of two basic formal elements: a terrace platform (or tread) and a terrace slope (or riser; Ažman Momirski, 2008b). The criteria for determining the types of terraced landscapes are defined according to:

- The use or function of the terrace slope and terrace platform;
- The form of the terrace slope and terrace platform; and
- The construction of the terrace slope.

Land use relates to the exploitation of land through human activity in the landscape, and it is one of the best indicators of landscape structure and processes. Within Slovenia's cultural landscapes, three main types of terraces can be distinguished based on land use (Ažman Momirski, Kladnik, 2009):

- Agricultural terraces;
- Viticultural terraces; and
- Fruit-growing terraces.

Mixed types of terraces can be also found. Vegetables are grown below olive groves on terraces, fruit trees are planted on the slopes of agricultural terraces, and so on.

The construction of terraced slopes can be divided into three basic categories:

- Dry stone wall construction (traditional terraces);
- Slopes reinforced with stones that were grubbed out during cultivation of farmland, and later covered with earth and grassed over (traditional terraces); and
- Grassed terrace slopes (modern terraces based on traditional terraces, and modern terraces).

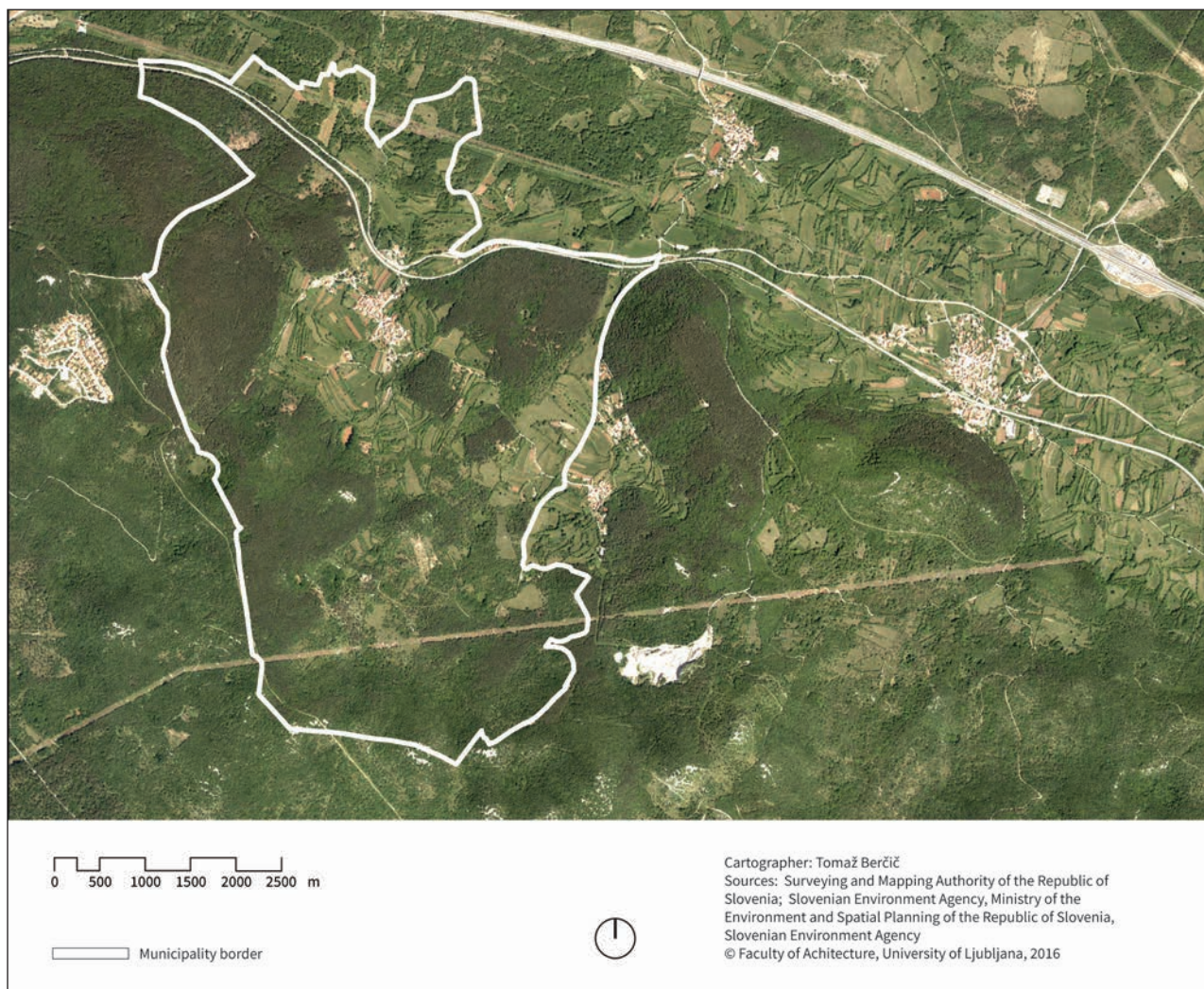


Figure 4: The Merče cadastral district.

This study focuses on terraced structures that are still largely intact, which means that the terraces are fully in agricultural use, and the slopes or dry stone walls are fully or largely maintained.

The selected study area was the settlement of Merče in the Municipality of Sežana, which is located in the Mediterranean plateaus (Figure 4). It covers 392 hectares and has a population of 108 (SURS, 2015). The lowest elevation in the territory is 342 m, the highest is 575 m, and the average is 424 m.

In order to determine the purpose, location, and characteristics of the terraces, digital orthophoto maps with an image element of 0.50 m were used as the first layer. The digital elevation model used had a resolution of 5 m and a height accuracy of 1 m in open areas and 3 m in overgrown areas. The tool is not as useful as LIDAR (Light Detection and Ranging), which is twenty-five times more accurate than the digital elevation model; LIDAR scanning has high resolution (Berčič,

2016). Land-use maps, which are a digital database of the Ministry of Agriculture, Forestry, and Food, have also been used. The database is regularly updated, and during the workflow it was compared with historical land use at a scale of 1:2,880 in the Franciscan Cadaster (AS-179).

Not only field observations, but also on-site measurements contributed to the accuracy of the selected site.

RESULTS

According to DEM5 (the digital elevation model) data analysis, there are twenty-three hectares of active terraced areas, which corresponds to 6% of the area of the settlement (Figure 5). The lowest elevation of the terraced area is 362 m, the highest is 439 m, and the average is 403 m.

For the analytical terrain measurements, the slopes of the cadastral district were divided into five classes or

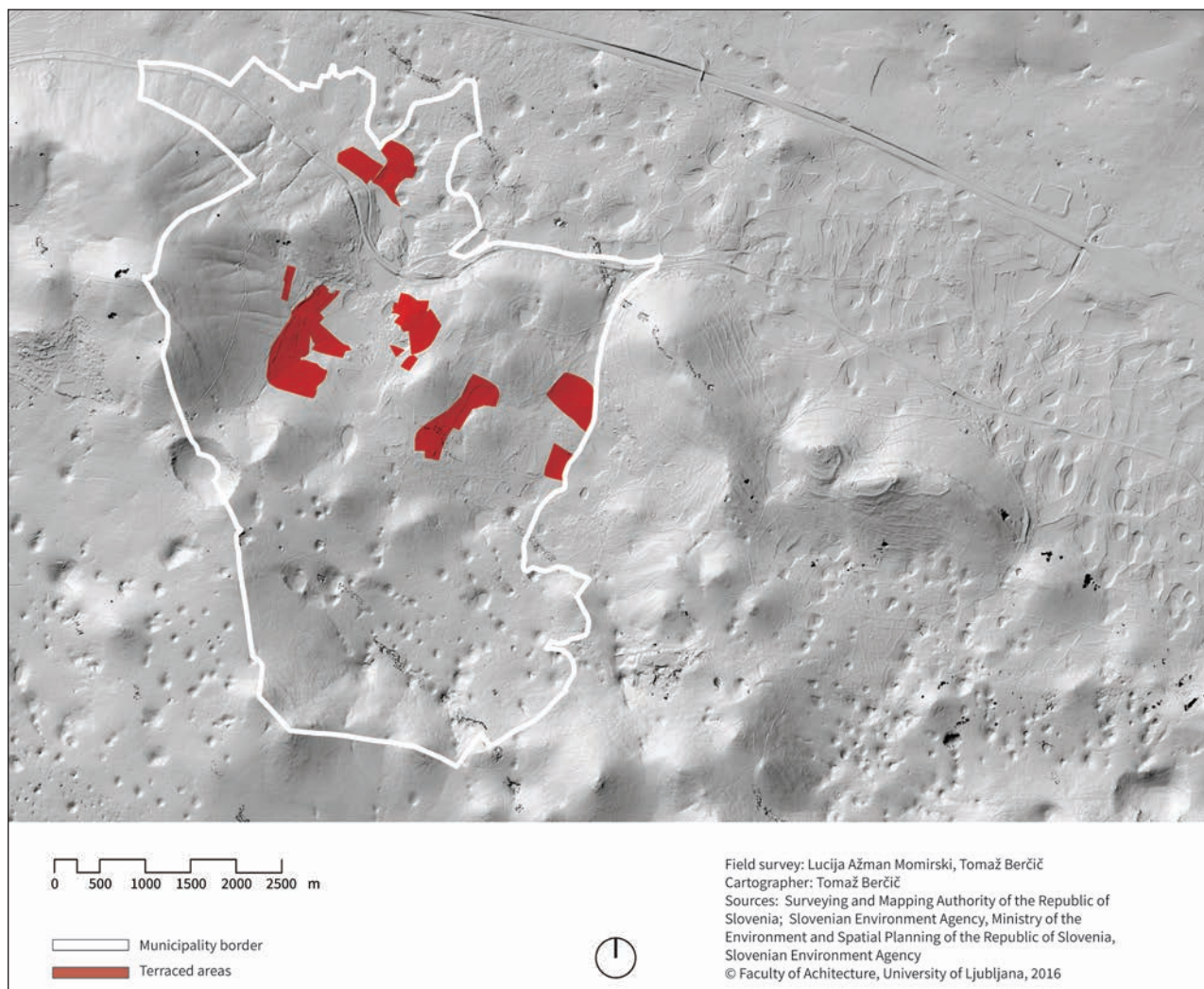


Figure 5: Location of terraced landscapes in the Merče cadastral district.

categories, with calculated inclinations in degrees or output as percentage values (Ažman Momirski, 2008). The first category ranges from 0 to 15% (0–8.5°), the second from 15 to 30% (8.5–16.7°), the third from 30 to 50% (16.7–26.6°), the fourth from 50 to 70% (26.6–35°), and the fifth over 70% (35°). The slopes in the Merče cadastral district are quite low because 45% of them fit into the first category. The second category includes 34% of slopes, the third category 17%, the fourth category 3%, and the fifth category 1%. The terraced landscapes in the Merče cadastral district are mainly located in the category ranging from 0 to 15% (0–8.5°); that is, 69% of terraced areas. In the second category are 22% of terraces, in the third category 8%, and in the fourth category 2%. No terraces can be found in the fifth category.

The aspect analysis of the entire settlement is mixed (N 16%, NE 19%, E 23%, SE 15%, S 7%, SW 5%, W 6%, and NW 9%) and the aspect analysis of the ter-

raced areas is also mixed (N 11%, NE 15%, E 25%, SE 16%, S 7%, SW 6%, W 10%, NW 10%). Most terraced areas are oriented toward the east, which corresponds to the aspect of the terrain of the entire Merče cadastral district.

The function of terraced platforms is mainly agricultural (meadows); some terraces near the settlement of Merče and its houses are vineyards, and some have vegetable gardens. Comparing the LIDAR results, it was noticed that there are vineyard terraces that are now overgrown with trees.

Terraced slopes in Merče are regularly constructed with dry stone walls, which in some cases today have disappeared under vegetation, which has grown into the stones. In rare cases a terrace or two with terraced grass slopes was observed (Figure 6). Terraces within a sinkhole, in which part of the slope of the sinkhole is terraced, as described and sketched in the literature (Gams, 1991), were not found in Merče.



Figure 6: Aerial view of terraced landscapes in the Merče cadastral district (Photo: Matevž Lenarčič).



Figure 7: View of a terraced landscape near Merče (Photo: Lučka Ažman Momirski).

Dry stone walls usually run parallel to the slope and usually, but not always, delimit the terraces; in some cases they run perpendicular to the slope (Figure 7). This fact, combined with the previous finding that terraced landscapes in the Merče cadastral district are mainly located in a category ranging from 0 to 15% (0–8.5°), makes the precise detection of the terraced areas extremely difficult. Consequently, some terraces were measured manually on the ground, and the result was a detailed cross-section of an individual terrace in the Karst cultural landscape near Merče (Figure 8). In addition to the low slope inclination of the terrain, the terrace slope height is also low and the terrace slope width is narrow. The entire terrace height is, however, higher because the terrace platform has an inclination similar to that of the terrain. The terrace platform and terrace width are quite wide.

Past interviews with locals (Gams, 1991) indicate the depth of stone removal in the terrain: between 40 and 90 cm, and mostly “up to the knee”. For the vineyards on slopes, farmers cleaned stones from bottom to top, and the stones were mostly deposited along the lower wall or scaffolding, and to some extent along the side wall. Clearing stones from slopes was therefore easier than on flat fields. The soil had to be deeper in fields, but this depth was not necessary for vineyards. More stones were accumulated in vineyards than in fields. The basic form of the vineyard system is cultivated terraces with dry stone walls. If necessary, the stones were embedded in the walls and earth was thrown onto the pile. Some of the stones were placed on the rock in front of the steep slope and earth was spread over the entire terrace. The originally greater depth of the soil on many properties has changed due to exposure.

Because all of the fieldwork was done manually, the roads do not necessarily allow access to each terrace. The forms of the terraces are also not even, as can be observed, for example, in the Brkini Hills or the Koper Hills, where the regulated pattern of the terrace platforms is quite geometric. In the Merče cadastral district, some terraced platforms form a regular repetition of the terraced structure, but there is much more irregularity of forms than in other terraced landscapes of Slovenia, considering both the width and height of the terraces (Figure 9).

DISCUSSION

In recent decades, the constant threat to the Karst Plateau has been promoted by numerous efforts to preserve the natural and cultural values of the karst landscape.

¹ Škocjan Caves Regional Park was established in 1996 by the Škocjan Caves Regional Park Act (ZRPS), *Official Gazette of the Republic of Slovenia*, no. 57/1996, 7/1999-ZVKD, 110/2002-ZGO-1). The UNESCO committee, which included Škocjan Caves in the list of world natural and cultural sites in 1986, threatened the Slovenian government that Škocjan Caves could be removed from the list if appropriate protection, management, and safeguarding the caves' environment were not provided.

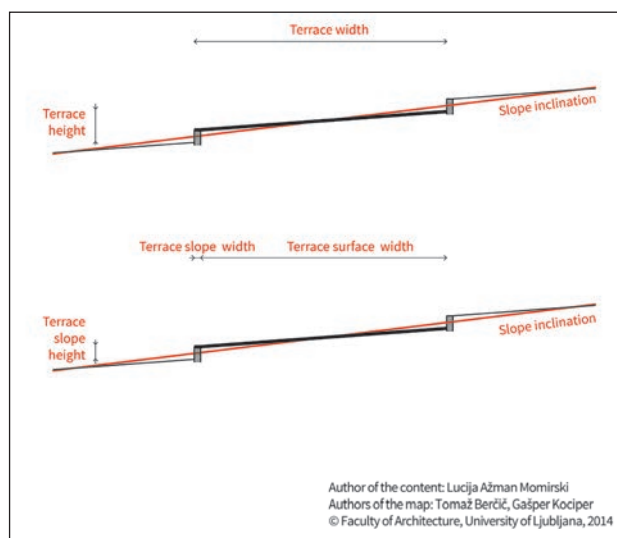


Figure 8: Cross-section of an individual terrace in the karst cultural landscape near Merče.

cooperation. The main objective of the call was to promote sustainable development, management, and cooperation in a future karst park;

- Almost in parallel, the Ministry of the Environment and Spatial Planning started implementing the main Timav: Karst Regional Park project as part of the national and cross-border PHARE program. The main objective of this project was to protect groundwater quality and preserve the unique natural values of the Karst region. The project initially focused on revitalizing the Reka River. At the beginning of the Škocjan Caves Regional Park project,¹ preparations were also made for a plan to establish and manage the karst region;
- In 1997, at the request of the Ministry of the Environment and Regional Planning, the Oikos company drew up expert bases for the Regional Park Management Plan (Harmel, Kobal, 1997);
- In 1996, the Štanjel–Karst Pilot Project began with the establishment of an interministerial government committee and a coordination structure for project management;
- In 1998, the project Cycle Route Network in the Karst marked 370 km of cycle routes and published the map *Cycling through the Karst Park*.
- In 1998, the much-appreciated roundtable Authentic Architectural Heritage of the Karst Plateau was held in Lipica, which dealt with preserving and repairing the building stock on the Karst Plateau.



Figure 9: Various elements of the terraced landscape in the cadastral district of Merče (Photo: Lučka Ažman Momirski).

From 1999 to 2003, the Karst Pilot Project was re-launched, with the aim of preparing a regional development program, also as a basis for Karst Regional Park.

The Karst Pilot Project was a joint project of six Karst Plateau communities, seven ministries, and the Council of Europe. The aim of the project was to create a strategy and program for sustainable development of the Karst region, including integral protection of natural and cultural heritage. The CPC is intended to pool all the leverage forces throughout the karst area in order to protect and preserve the nature of the karst cultural landscape and all the natural and cultural features of the area. The project points out the advantages of the karst landscape, development potentials, and options for sustainable development. The following documents were prepared as part of the project:

- Problem analysis of the functionally consolidated karst region: a joint assessment of the region and identification of key questions that are the starting points and guidelines for the development program;
- A joint development program of the municipalities of Divača, Hrpelje–Kozina, Komen, and Sežana, and the karst portions of the municipalities Koper and Miren–Kostanjevica, with a strategic part for

2001–2010 (from January 18th, 2002); this is a politically binding document based on a long-term vision, a development orientation, and the strategic choice of development partners;

- Agreement on cooperation on establishing Karst Regional Park (dated July 11th, 2000), signed by the minister for the environment and regional planning, the chair of the Interdepartmental Committee for the Karst, and the mayors of the Karst Plateau municipalities of Divača, Komen, Miren–Kostanjevica, Hrpelje–Kozina, Koper, and Sežana. The area of the planned park was the subject of the karst pilot project mentioned above;
- The implementation part of the joint development program for 2003–2006 for the municipalities of Divača, Hrpelje–Kozina, Komen, and Sežana, and the karst portions of the municipalities of Koper and Miren–Kostanjevica, includes priority projects for the period from 2003 to 2006 to implement the vision.

A special feature of the Karst Pilot Project was its methodology because it advocated a bottom-up approach. This means that the most important development guidelines should come from locals (the local

population) and not only experts or politicians. The inclusion of local proposals is a guarantee that the possible Karst Regional Park will not become a “reserve” where static or excessive restrictions prevail.

Why were terraced landscapes not included in these efforts? Studies have shown that Slovenian spatial planning has not recognized terraced regions as a landscape system *sui generis* (Ažman Momirski, Berčič, 2016). Working out professional guidelines for the landscape is performed by local municipalities, which often follow the principle of not implementing anything that is not required. However, awareness of terraced landscapes is growing at the global, European, and national levels. Research, academic studies, and civil initiatives have also taken place in Slovenia. What is missing is a link between research and local developments.

Reactions of civil society movements and partnerships to the threat to the cultural landscape

The local population perceived the situation over a decade ago as a threat and recognized it as a major land-management problem. It began to recognize that the natural environment is a limited good. If such goods are exhausted or destroyed, they cannot be replaced. At the level of a civil society movement, a civil society awareness campaign was organized, known as the Karst Civil Initiative (*CI Kras*). The initiative has begun to draw the attention of the responsible authorities to the shortcomings of the current spatial planning and implementation regulations of the Municipality of Sežana. The areas for the development of settlements on the Karst Plateau were indeed oversized, which was also one of the main reasons why such extensive construction projects were (legally) possible. The fact is that there are about 2,400 building units with just over seven thousand inhabitants in about sixty-three villages on the Sežana Karst Plateau (the town of Sežana is excluded here). According to the available planning documents, it would be possible to erect more than five thousand residential buildings with land in an area of approximately 800 m², which corresponds to more than doubling the population in the villages of the Municipality of Sežana (Lah, 2008, 15).

Over the years, increasingly more supporters and sympathizers have joined the Karst Civil Initiative, especially at a time when the municipalities are preparing new spatial acts. The organized public has therefore addressed Karst Plateau issues loudly and discussed them publicly. It held numerous roundtables and expert consultations, and it addressed many of the proposals, initiatives, and requirements to the responsible institutions.

- From 2008 to 2012, the Karst Civil Initiative particularly emphasized the following issues:
- Inadequate (outdated) spatial plans or legislation involving outstanding natural and cultural heritage;

- The ratio between the renewal of the existing building stock and planning new buildings, and overly large areas for new buildings;
- Modern development, which should be based on a model of sustainable development and conservation;
- Establishing a protected area for the Karst Plateau or a karst regional park;
- Timely and equal participation of the public in spatial decisions;
- Preserving the national and cultural identity of the Karst Plateau (Barič, 2010, 38–39).

Similar reactions and opposition from the public have recently been triggered by proposals and maintenance measures on public roads on the Karst Plateau aimed exclusively at improving or ensuring road safety. As a rule, the majority of interventions were very poorly adapted to the characteristics and identity of the area. In addition to the other technical measures, the maintenance measures included the removal of dry stone border walls, cliffs, road signs and stones, historical bridges, and other features.

The initiator of the public discussion was the management board of the Partnership for Karst Dry Stone Construction, a civil society association of individuals and legal entities in the cross-border Karst Plateau region. The conference topics, which included recognized experts, included landscape features such as road walls, masonry, terraces, road stones, historical bridges, historical signs, and so on as valuable components of road infrastructure that have recently suffered frequent damage, vandalism, and planned destruction by planners and contractors.

One of the conclusions of the public discussion is that the participants must emphasize above all that, when planning maintenance and repair measures on all municipal roads on the Karst Plateau, only safe technical solutions are permitted. The proposed solutions must also be appropriate in terms of architectural design, landscape protection, and conservation of natural and cultural heritage, and they must be agreed upon with the public beforehand. The implementation of measures to improve road safety should include the following:

- Preparation of preliminary road-safety assessments of the road network, including traffic congestion, road-safety indicators with the number of road accidents, the frequency and severity of accidents, and a comparison of results over time;
- Treatment of elements of cultural heritage as an important part of the landscape and, where possible, their incorporation into new roadways or for them to be left untouched or avoided by new installations. Dry stone walls should be preserved in karst areas on less frequented

roads and on the more traffic-friendly ones if they do not impair road safety. Appropriate solutions should be found for structures and areas of immovable heritage to prevent the addition of safety fences along banks;

- Responsible selection of contractors for maintaining and repairing registered sections of road infrastructure with historical value, which must include, in addition to the applicable provisions, the lowest price criteria, including quality of work, and a high level of knowledge and solutions in working with the heritage of artists (Partnership for Karst Dry Stone Construction, 2018).

The public discussion also presented the current research on Slovenia's terraced landscapes, including the findings that the concept of terraced landscapes is not used in documents at the national and local levels, and that national documents do not contain the terms "terrace" and "terraced slope." These findings are surprising because terraced landscapes are found in 193 municipalities in Slovenia, but they also indicate that global and international trends and Slovenian research that has been carried out have had no impact on Slovenia's strategic, legislative, and spatial documents to include specific concepts related to terraced landscapes in their texts.

MODELS FOR ESTABLISHING A PROTECTED AREA ON THE KARST PLATEAU

How is it possible to protect the karst landscape, and how can a protected area be established? These topics have been important for decades, and Slovenian society and the Slovenian state, with all its institutions responsible for the matter, have failed to find adequate answers. In accordance with the objectives of the Resolution on the National Program for the Protection of the Environment 2005–2012 (*Resolucija o nacionalnem programu varstva okolja 2005–2012*, 2006), the share of protected areas in Slovenia should increase to 22% by 2014. From the analyses and available data from the Ministry of the Environment and Spatial Planning, it can be concluded that the current status of all protected areas in Slovenia in 2018 is only 14% of the country's territory.

Even experts can be convinced that the Karst Plateau has long been a protected area of Natura 2000. With the Regulation on Special Protection Areas, the Slovenian government has included almost the entire Karst Plateau in Slovenia's special protection areas on the basis of two EU directives: the Directive on the Conservation of Natural Habitats and of Fauna and Flora, and the Birds Directive. For almost two decades, the European Union has established a network of specially protected Natura 2000 sites. The main aim is to conserve and protect the natural habitats of en-

dangered plant and animal species, but not the actual protected areas, or parks. Its aim is to preserve biodiversity. In addition, the choice of the protection regime for Natura 2000 sites is at the discretion of each member state.

Certainly, there are several various ways or models for creating truly protected areas in accordance with the recommendations and categorization of the IUCN (International Union for Conservation of Nature), which requires, among other things, uniform land management (IUCN, 2018).

It should not be overlooked that Slovenia is a signatory of the European Landscape Convention (Slovenia signed the convention on March 7th, 2001 and ratified it on July 15th, 2003) (*Zakon o ratifikaciji Evropske konvencije o krajini* (2003)). As a signatory to the convention, Slovenia is committed to its outstanding landscapes, including its terraced karst landscapes, and to establishing and implementing landscape policies aimed at landscape protection, management, and planning through the adoption of specific measures. The first step toward this objective is to raise awareness of its existence; that is, through a precise inventory of this landscape throughout the karst area.

For terraced landscape preservation, in addition to agricultural models, there are also land-stewardship models and UNESCO world heritage sites, as well as other models of terraced landscape regeneration. The motivation to explore them is to achieve multiple answers to how to change passive heritage into active heritage, how to foster the longevity of terraced landscapes, and how to contribute to the local community as part of this goal. The methodological principles of strategic spatial planning for regenerating terraced landscapes link these with society and promote the innovative use of cultural heritage (Ažman Momirski, 2019). This is in line with the New Urban Agenda of Habitat III (2018), which emphasizes promoting the use of cultural heritage for sustainable spatial development and recognizes its role in extending participation and civic responsibility.

In the future, a heritage-led sustainability landscape model will require measures for further development, including:

- Good knowledge of the location;
- Good knowledge of activities at the site;
- Defining common goals of participants at the site;
- A network of participants;
- Promoting the territory and activities;
- Selecting forms of management by skilled participants;
- A participatory process (involvement of all participants);
- Innovative services; and
- Planning, design, and regeneration of terraced landscapes.

It is not necessary to repeat all the technical studies, analyses, and status documents produced out so far, which contain numerous technical arguments and statements that this is an outstanding landscape with many natural and cultural values, which inevitably requires a suitable protection law and management plan; examples include a resolution on national development projects for 2007–2013 (Resolucija o nacionalnih razvojnih projektih 2007–2013, 2006) and a resolution on the national environmental protection program for 2005–2012. On the other hand, it is necessary to carry out new studies, such as an inventory of the terraced landscape, that

provide hitherto lacking data and information about the karst landscape. Of particular importance is the fact that it is indirectly possible, through territorial protection, to take necessary measures to protect national interests and cultural identity. When one speaks of the identity of a space, a settlement, or a building, this refers to a set of attributes according to which space and structures can be separated from others. Identity is an array and a mixture of features that characterize spatial structures and give them an identity. They create a unique image of a building, a city, and a landscape.

IZJEMNA KULTURNA KRAŠKA POKRAJINA: PRVINE TERASIRANE POKRAJINE IN KREPITEV NARAVNIH IN KULTURNIH VREDNOT KRASA

*Ljubo LAH*Univerza v Ljubljani, Fakulteta za arhitekturo, Zoisova 12, 1000 Ljubljana, Slovenija
e-mail: ljubo.lah@fa.uni-lj.si*Lucija AŽMAN MOMIRSKI*Univerza v Ljubljani, Fakulteta za arhitekturo, Zoisova 12, 1000 Ljubljana, Slovenija
e-mail: lucija.azman@fa.uni-lj.si

POVZETEK

Izjemna kulturna kraška pokrajina je v sodobnosti, kljub aktivnostim različnih civilnih združenj, iniciativ in partnerstva, pogosto ogrožena. Ogrožajo jo zlasti pomanjkljiva ozaveščenost prebivalstva in kapitalski pritiski na katere se lokalne skupnosti neustrezno odzivajo s svojo komunikacijo, prostorskimi akti in razvojnimi politikami. Ob tem je pogosto neučinkovito tudi posredovanje in delovanje odgovornih državnih institucij. V razpravi se osredotočamo na prvine terasirane kraške pokrajine, ki se po svojem razvoju in značilnostih razlikujejo od drugih terasiranih pokrajin v Sloveniji. Njena individualna in osnovna narava in njene najbolj pomembne kvalitete so bile preučevane v katastrski občini Merče, ki leži v občini Sežana. Slovenija kot podpisnica Evropske konvencije o krajini se je zavezala, da za svoje izjemne krajine - mednje zagotovo sodi tudi terasirana kraška krajina - "izvaja krajinsko politiko, katere cilji so varstvo, upravljanje in načrtovanje krajine na podlagi sprejemanja posebnih ukrepov". Prvi korak k temu cilju je ozaveščanje o njenem obstoju, torej tudi natančna inventarizacija krajine na celotnem območju Krasa.

Ključne besede: terasirane pokrajine, identiteta, izjemne krajine, inventarizacija, Kras, naravne vrednote, kulturne vrednote

SOURCES AND LITERATURE

AS-179, G/FJ/G131 – Arhiv Republike Slovenije (AS), Franciscejski kataster za Primorsko, Goriška kresija, katastrska občina Merče (fond 131).

Ažman Momirski, L. (2008a): Goriška Brda. The Terraced Vineyards of Goriška Brda. In: Fontanari, E. & D. Patassini: *Terraced Landscapes of the Alps: Atlas*. Venice, Marsilio.

Ažman Momirski, L. (2008b): Terasirana pokrajina. In: Ažman Momirski, L. et al.: *Terasirana pokrajina Goriških brd*. Ljubljana, Založba ZRC, 98–118.

Ažman Momirski, L. (2008c): Kulturne terase v južnih Goriških brdih na primeru katastrske občine in naselja Medana. In: Ažman Momirski, L. et al.: *Terasirana pokrajina Goriških brd*. Ljubljana, Založba ZRC, 119–138.

Ažman Momirski, L. (2008d): Kulturne terase v severnih Goriških brdih na primeru katastrske občine in naselja Kožbana. In: Ažman Momirski, L. et al.: *Terasirana pokrajina Goriških brd*. Ljubljana, Založba ZRC, 139–558.

Ažman Momirski, L. (2019): Slovenian Terraced Landscapes. In: Varotto, M., Bonardi, L. & P. Tarolli (eds.): *World Terraced Landscapes: History, Environment, Quality of Life*. Springer International Publishing, Environmental History, 9, 45–62.

Ažman Momirski, L. & D. Kladnik (2009): Terraced Landscapes in Slovenia (Terasirane pokrajine v Sloveniji). *Acta geographica Slovenica*, 49, 1, 7–37.

Ažman Momirski, L. & T. Berčič (2016): Ignored Regions: Slovenian Terraced landscapes. *Annales, Series historia et sociologia*, 26, 3, 399–418.

Barič, A. (2010): Kako s pravom zavarovati Kras pred neracionalno in nerazumno ekspanzijo novih pozidav, pravni vidik ustreznosti načina participacije javnosti pri sprejemanju občinskih prostorskih načrtov (diplomska naloga). Univerza v Ljubljani, Pravna fakulteta.

Cultural Landscapes (2015): <http://whc.unesco.org/en/culturallandscape/> (last access: 28. 10. 2015).

Dorsi, P. (1989): »Libertà e 'legislazione'. Il rapporto del barone Pittoni sullo stato della città di Trieste e del suo territorio (1786). *Archeografo Triestino* IV, 49, 137–85.

Gams, I. (1987): Kraške agromelioracije: nastajanje, oblike in pomen za sedanjo rabo tal. *Geographica Slovenica*, 18, 167–182.

Gams, I. (1991): Sistemi prilagoditve primorskega dinarskega krasa na kmetijsko rabo tal. *Geografski zbornik*, 31, 5–106.

Gams, I., (1995): Kaj pomeni beseda »kras«?: Razvoj slovenske besede kras v mednarodni terminologiji do konca 19. stoletja. *Kras*, 2, 10, 34–37.

Harmel, M. & J. Kobal (1997): Kraški regijski park: nastaja načrt upravljanja. *Kras*, 20, 14–15.

IUCN: International Union for Conservation of Nature (2018): <https://www.iucn.org/theme/protected-areas/about> (last access: 5. 6. 2018).

Hudoklin, J. (2008): Terraced Landscapes: Areas of Landscape Identity in Changing Processes. In: Ažman Momirski, L. & B. Černič Mali (ed.): *Living Terraced Landscapes: Perspectives and strategies to revitalise the abandoned regions*. Ljubljana.

Kranjc, A. (1994): O imenu in zgodovini pokrajine Kras. *Annales, Series historia naturalis*, 4, 4, 131–134.

Kranjc, A. (ed.) (1997): Kras: Slovene Classical Karst. Ljubljana, Znanstvenoraziskovalni Center SAZU, Založba ZRC, Inštitut za raziskovanje krasa ZRC SAZU.

Lah, L. (2008): Ključna vprašanja in odgovori o prostorskem razvoju Krasa. V: Zelnik, D. (ur.): *Ohranitev kraške krajine kot razvojna priložnost Krasa: zbornik referatov in razprav Državni svet Republike Slovenije*, Ljubljana, 13–18.

Lago, L. (1994): La memoria culturale del territorio. In: Lago, L.: *Le "casite". Pietre e Paesaggi dell'Istria centro-meridionale. Un censimento per la memoria storica*. Fiume, Trieste, Centro di Ricerche Storiche di Rovigno.

Loeper, N., Ott, M. & L. Ažman Momirski (2016): Terraced landscapes: New Design Solutions within the Transformation of Artificial landscapes. *Annales, Series historia et sociologia*, 26, 3, 523–536.

Luthar, O., Dobrovoljc, H., Fridl, J., Mulec, J. & M. Pavšek (ed.) (2008): Kras: trajnostni razvoj kraške pokrajine. Ljubljana, Založba ZRC, Ljubljana.

Loumou A & C. Giourga (2003) Olive Groves: "The Life and Identity of the Mediterranean". *Agric Hum Values*, 20, 87–95.

Mavrič Štrukelj, M., Brdnik, M., Hauptman, S., Štabuc, R., Novak, E., Martinčič, J. & A. Škvarč (2012): Vinogradniške razmere v Sloveniji danes. In: Rusjan, D. (ed.): *Zbornik referatov, Slovenski vinogradniško-vinarski kongres z mednarodno udeležbo*. Ljubljana, Univerza v Ljubljani, Biotehniška fakulteta.

MOP (2013): Celovit strateški načrt za prostorski razvoj slovenskega dela Krasa. Poročilo Interreg 2007–2013, projekt Kras-Carso.

Nicod, J. (1987): Amenagements agraires dans de petites depressions karstiques (en Provence Et dans les Causes, et dans quelques régions de comparaison en Italie et Yougoslavie). In: *Karst and Man, Proceedings of the International Symposium on Human Influence in Karst*, Postojna. Ljubljana, Department of Geography, Philosophical Faculty, University of Ljubljana, 97–110.

Nicod, J. (1992): Muretti e tarrazze di coltura nelle regioni carsiche mediterranee. *Itinerari speleologici* 6, 9–18.

Zelnik, D. (ed.) (2008): Ohranitev kraške krajine kot razvojna priložnost Krasa: zbornik referatov in razprav. Ljubljana, Državni svet Republike Slovenije, Ljubljana.

Panjek, A. (2015): Kulturna krajina in okolje Krasa. O rabi naravnih virov v novem veku. Koper, Založba Univerze na Primorskem.

Partnership for Karst Dry Stone Construction (2018): <http://kraskagradnjanasuho.wixsite.com/suhozidnagradnja/single-post/2018/02/27/IZJAVA-ZA-JAVNOST> (last access: 5. 6. 2018).

Radinja, D. (1987a): Man and Karst in the NW Part of the Dinaric Mountain System: The Karst Stone Walls and Enclosures. In: Karst and Man, Proceedings of the International Symposium on Human Influence in Karst, Postojna 1987. Ljubljana, Department of Geography, Philosophical Faculty, University of Ljubljana, 111–122.

Radinja, D. (1987b): Modern Land Improvement in Slovene Dinaric Karst. Removal of Rock on the Continental Side and Spreading of Clay on the Littoral Side of Karst. In: Karst and Man, Proceedings of the International Symposium on Human Influence in Karst, Postojna 1987. Ljubljana, Department of Geography, Philosophical Faculty, University of Ljubljana, 123–135.

Resolucija o nacionalnem programu varstva okolja 2005–2012 (2006): Uradni list Republike Slovenije 2/2006. Ljubljana.

Resolucija o nacionalnih razvojnih projektih 2007–2013 (2006): Vlada Republike Slovenije, Ljubljana, 2006.

Register of Grape and Wine Producers (RPGV) (2016): https://podatki.gov.si/dataset/register-pridelovalcev-grozdja-in-vina?resource_id=6c32828c-90a6-48f0-b559-46dc7391542b (last access: 17. 2. 2017).

Škvarč, A. & I. Kodrič (2007): Nature and Regulation: Management of Vineyards and Orchards on Terraces. *Urbani izziv*, 17, 1/2, 78–84.

Terkenli, T. (2001): Local perceptions of tourism Impacts on Place Identity: The Case of Northern Crete. *Tourizam*, 49, 3, 229–240.

Varotto M., Ferrarese F. & S. E. Pappalardo (2019): Italian Terraced Landscapes: The Shapes and the Trends. In: Varotto M., Bonardi L. & P. Tarolli (eds.): *World Terraced Landscapes: History, Environment, Quality of Life*. Springer International Publishing, Environmental History, 9, 27–43.

UNESCO Tentative Lists (2018): <http://whc.unesco.org/en/tentativelists/6072/> (last access: 5. 6. 2018).

Zakon o ratifikaciji Evropske konvencije o krajini (2003): Uradni list Republike Slovenije 74/2003, Ljubljana.