



Significance of cultural heritage practices in karst landscape management: 2030 Agenda for Sustainable Development

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Abstract

Throughout historical periods, people have developed various practices for the comprehensive use of natural resources that can be utilized to meet the requirements of contemporary sustainable living. This traditional knowledge and the ways of life of ancestors are recognized as cultural heritage, which has become a driving force towards achieving the 2030 Agenda for Sustainable Development in accordance with the cultural and heritage strategies and conventions of the UNESCO. However, to integrate them meaningfully into future landscape development, many challenges must be addressed by different actors (experts, researchers, decision makers, civil society, etc.). The aim of this article is to critically reflect on the concept of using cultural heritage practices for community development through the presentation and analysis of case studies on the participatory management of the UNESCO Karst Biosphere Reserve (and Reka River Basin) of the Škocjan Caves Park Public Service Agency in Slovenia (Europe). The article first addresses theoretical issues related to understanding cultural heritage as an important element of the enhancement of the sustainable development. It then presents active work in the Škocjan Caves Park Public Service Agency with stakeholders and two case studies that show how local karst heritage can be used to address biodiversity loss, drinking water scarcity, and global warming. In the conclusion some steps towards designing activities aimed to address sustainable development goals based on cultural heritage and participatory approaches are proposed.

Keywords Cultural heritage · Traditional knowledge · Karst landscape · Sustainable development · Biosphere reserves · Slovenia (Europe)

Introduction

In recent decades, the concept of cultural heritage has evolved considerably. It is no longer understood just as exclusively material things from the past that provide a physical link between the past and the present and have historical, artistic, architectural, spiritual, aesthetic, and other values for the well-being of future generations. Physical landscapes, monuments and objects cannot be separated from intangible beliefs, personal and collective narratives, memories,

and resonances. Recent emphasis is also been placed on the meanings, values, understandings, and roles of tangible and intangible elements constructed by local people and experts in communities, object-subject relationships, affective practices that trigger different interpretations of historical experiences, etc. (Logan et al. 2015; Tolia-Kelly et al. 2017; Smith et al. 2018). Moreover, conservation of tangible remains and safeguarding of intangible items are also non seen simply as a means of preserving and transmitting what is valued, but also as supporting the goal of sustaining life on Earth (Labadi et al. 2021). As a result, cultural heritage research also addresses how historical resources can be mobilized in the present to address pressing social, environmental, and economic problems and serve as a tool or resource for reflecting on and implementing social change (Lafrenz Samuels 2017). From this perspective, the history of human land use, traditional knowledge, and achievements related to natural resource use, care of land or water, and other traditional practices of ancestors could serve as a testimony or basis for new modifications, revisions, and alternatives

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to mitigate the consequences of modern industrial pollution, climate changes and to implement successful adaptation strategies (Labadi and Gould 2015; Labadi 2018). The role of heritage practices for achieving sustainable living can be seen in three aspects. First, because ancestors lived in coexistence with nature and its resources and without the use of today's technologies and artificial materials, their traditional knowledge and skills can be important in addressing today's environmental problems and developing sustainable lifestyles. Second, heritage activities as social activities can help to create social cohesion, intergenerational connections, forms of life-long learning, conditions for a creative environment, etc. And third, heritage activities can provide a positive framework and opportunities to introduce local people to other participatory activities for searching solutions for sustainable and self-sufficient communities (Fakin Bajec 2014; Labadi et al. 2021).

The 2030 Agenda for Sustainable Development (United Nations 2015) recognizes the role of culture and cultural heritage for introducing sustainability, but the problem is that no specific goal mentions them. They are reflected only in some of the targets, including those for sustainable cities and communities, use of public space, quality education, decent work and economic growth, climate action, gender equality, innovation, and peaceful and inclusive societies (Culture for Agenda 2030 2018). Reasons to not recognize cultural heritage as a driver and an enabler of sustainable development are different, according to Sophia Labadi "one of them might be in models of (sustainable) development that exclude culture and heritage as they associate development with economic growth, Western capitalism and notions of occidental modernist" (Labadi 2018). In fact, the 2030 Agenda still considers heritage as an object to be protected rather than as an active driver for sustainable communities (Giliberto and Labadi 2022). Many scholars and professionals thus highlight that more needs to be done to understand and address the potentials and challenges that heritage brings to each goal and towards wider social, environmental, and economic challenges, thereby fostering peace and security (ibid). To this end, it is essential to study and understand the significance and cultural meanings interwoven in the tangible and intangible items of the past that can be used and perceived with a holistic understanding of what has been handed down to us. One of the main challenges, therefore, is how to examine, understand, reflect, modify, and enhance the knowledge and practices of local communities that embody traditional ways of life relevant to the inclusive conservation and sustainable use of natural and cultural environment, and how to promote their wider application with the participation of the bearers of this knowledge, i.e. local people (Bridgewater and Rotherham 2019). Many experts who work with people or try to involve them in different project activities confess that community engagement is a long, strategic and difficult

process (McCloskey et al. 2011), which demands project teams to obtain appropriate skills, knowledge and the ability to work with people. Many potential conflicts can exist over who should identify and manage heritage resources; who should represent the community and how local community can make enlightened decisions (Labadi 2018).

The main purpose of this article is thus to reflect theoretically, and through the presentation of two cultural practices from the Karst (and Reka River Basin) Biosphere Reserve (hereafter KBR) in Slovenia (Europe), how cultural practices, traditional knowledge and skills connected with the usage of natural resources (stone and water) could be examined and utilized to establish sustainable karst landscape and communities. The article also illuminates participatory approaches and processes central to the inclusive growth, integrative management of cultural heritage and landscape, to promote the active participation of local people in society and social inclusion, fundamental freedoms and cultural diversity. This is of particular importance in the preparation of action plans and programs, where not only a cross-sector approach is required, but also the reception and acceptance of the voices of local people (Fakin Bajec 2020).

The paper first addresses theoretical questions regarding the understanding of cultural practices and its heritage as an important element of the enhancement the sustainable living. It then presents methodological backgrounds and KBR management that is to work with stakeholders in pursuit of the 2030 Agenda for Sustainable Development goals (hereafter SDGs) within a specially devised networking system. In the last section, two case studies on how local Karst heritage can be used to address biodiversity loss, scarcity of drinking water and global warming are presented. In the conclusion, some steps towards designing activities aimed to address SDGs based on cultural heritage are proposed.

Theoretical background on cultural heritage and sustainable development

Nowadays, the concept of heritage can be interpreted in many different ways (Sting Sørensen and Carman 2009), and used to cover just about everything that a human has made or transformed. It refers not only to material remnants but also to intangible elements including "the character or feel of a place, its aura as well as customs, traditions, language, dialects, musical styles and religious or secular rituals. There is no need that the tangible or intangible things are architectural or aesthetic features, they can be painful, ugly, unsafe and unprepossessing; old or new; something that can be valued by society, by a specific group within society and by individuals" (Schofield 2008). Furthermore, heritage is not restricted only to actions from experts, working in museums, archives, libraries, research centers, Ministry of culture and

other state officials or bodies, but can include the most basic and ordinary ways of life and activities of the people (UNESCO 2003). In Slovenia, many communities (e.g. cultural associations, study circles, primary and secondary schools, villages, neighborhoods) carry out activities to preserve their local past (e.g. researching local history, organizing village and local festivals, reviving old customs, restoring local architectural objects, or researching and using old skills and knowledge to make new products, cultural oriented school projects). Most of the activities related to the creation of local heritage are organized in their free time. In this way local people create a positive attitude towards their past, create and preserve heritage resources, take care of their interpretation and through these practices strengthen the local identity and cohesion of the community. More and more attention is being paid to school activities as it has been recognized that values embodying elements of heritage should also be urgently discussed by children and young people who are already forming and reflecting on their personal and social identity (Lemut Bajec 2019). Graham Fairclough thus emphasizes that "heritage is object and action, product and process" (Fairclough 2009). It means not only the things that we inherit, irrespective of whether we want to keep them, but it can also be taken to mean the processes and social practices by which we understand, contextualize (physically and intellectually), perceive, learn, manage, modify, destroy, and transform the inherited world (Smith 2006; Logan et al. 2015; Fakin Bajec 2020). Heritage at its base is still linked with the work, thinking, actions, traditional knowledge and experiences of predecessors; however, it is not only about the past but "draws on the power of the past to procedure the present and shape the future" (Harrison et al. 2008).

Moreover, influenced by the policy of Agenda 2030 for Sustainable Development (United Nations 2015), European heritage strategy for the twenty-first century (Council of Europe 2018), and other national policies of State Parties, heritage practices have become a resource to alleviate contemporary development challenges, such as cultural and environmental sustainability, economic inequalities, conflict resolution, social cohesion, future of cities, human rights, democracy, future of the state and other communities, etc. (UNESCO 2010; Labadi and Gould 2015). However, the complexity and limitations of the concept of sustainable development lead to many conflicts and misunderstandings on the ground where local people live. One of the main problems is that many heritage projects conducted by regional development agencies, economic organizations, tourist offices etc., tend to commercialize cultural and heritage practices for economic purposes and objectives. This often neglects or even forgets the emotional attitudes of individuals and local communities towards the past items. In local communities, therefore, utilization of heritage practices for economic development triggers a variety of moods,

individual and collective responses (Ashworth 2014; Fakin Bajec 2020). Hence, using the idea that cultural narratives, values and actions can help to shape a more culturally sensitive understanding of sustainable development and to clarify the role of arts, culture and cultural policies in this endeavor is far from many scholars try to emphasize (Kangas et al. 2017). For this reason the role of cultural heritage as a resource for progress should be considerably and thoughtfully discussed among many stakeholders, especially among experts, local politicians, entrepreneurs and civil society, and carefully incorporated into community development practices. Moreover, the notion of development should be shifted from a mono-dimensional, economically-focused, and Western vision of development towards a multi-dimensional, co-evolving, equitable, human rights based, and context-dependant approach (Labadi 2018; Giliberto and Labadi 2022). Thus, UNESCO promotes the notion of human development by placing people at the center of development processes (Labadi 2018). One of the programs conceived as a framework to address these issues is the UNESCO Man and Biosphere program (hereafter MAB). While emphasizing that biosphere reserves (hereafter BRs) managed under the MAB program must contribute to the needs of society as a whole by charting a path toward a more sustainable future, the Seville Strategy (UNESCO 1996) already defines BRs as those that promote the integrated approach. The Lima Action Plan 2016–2025 (UNESCO 2017) further calls on biosphere reserves to ensure that the processes for establishing and managing them are open and participatory, involve all concerned stakeholders, and take into account local and indigenous practices, traditions and cultures, etc. The human dimension in the environment is central to both the conservation of ecosystems and their sustainable use (UNESCO 2002). While some researchers have criticized the "Man and biosphere" model for being based on an instrumental understanding of nature as a place where human and non-human species can be ordered and moved, without reflexive perspectives (Byrne and Birgit Ween 2015), case studies from the Karst Biosphere Reserve (KBR) of the Škocjan Caves Park Public Service Agency in the Classical Karst in Slovenia have proved that the program is a highly effective tool for the integrative protection of natural and cultural heritage and enables successful steps towards a sustainable way of life with nature.

Methodology

The present study is based on the results of the research project "*Cultural heritage – a medium for the introduction of sustainable development in a local place*", financed by the Slovenian Research Agency in the period between 2012 and 2015, where one of the authors worked on the development

Fig. 1 Core area of the Karst Biosphere Reserve – Collapsed *dolina* in the Škocjan Caves (Photo by Borut Lozej, 2014, Archive of ŠCP)



of participatory approaches and methods towards raising awareness that heritage practices, which among other things represent a bridge between nature and human behaviour, can make an essential contribution in the facilitation of sustainable living and its effectiveness in fostering social cohesion, wellbeing, intergenerational ties, gender equality, life-long learning programs etc. (Fakin Bajec 2016). The theoretical and practical results of the project were utilized for the analysis of two presented practices using different participatory methods by another author of the article who – based on ethnographic research, established cultural heritage practices and cooperation with other experts – involves local people and other sectors (entrepreneurs, schools, universities, NGOs) in different cultural activities carried out in the Karst (and Reka River Basin) Biosphere Reserve.

The study was thus implemented in a protected area renowned for the natural and cultural features of the Škocjan Caves, which were declared a UNESCO World Heritage Site in 1986. In 1999, they became the first underground wetland in the world to be included in the list of internationally significant wetlands of the Ramsar Convention. To preserve and study the exceptional geomorphologic, geological and hydrological formations, rare and endangered plant and animal species, paleontological and archeological sites, ethnological and architectural features and cultural landscape, and to ensure conditions for appropriate development, the 401 ha area above the cave system with three small villages and a buffer zone of 45,000 ha with the Reka River Basin was declared the Škocjan Caves Regional Park by the Parliament of the Republic of Slovenia in 1996. Since 2004, the same area with an additional transition zone totalling 60,000 ha has also been recognized as a UNESCO biosphere reserve (Figs. 1, 2). Since its proclamation, the

participatory management, launched by the former KBR coordinator Vanja Debevec, has been gradually developed. It is based on the network concept that follows the integrative approach and aims to connect the science and research sector with the local community and actively involve them in long-term management through education, awareness raising and participatory approaches (Debevec and Kranjc 2019). In 2020, Škocjan Caves Park Public Service Agency (ŠCP) staff manage two networks (the ŠCP International Network of schools and the ŠCP Network of universities), five committees (Committee for Providers and Producers; Committee for Entrepreneurs, Committee for Sustainable Tourism, Cultural Heritage Protection Committee) and a Consortium for karst dry-stone walling, which will be discussed in the section Case studies (Fig. 3).

Many activities in the KBR aim to incorporate cultural heritage into the sustainable management of the protected area, using various cultural practices (valuation of local historical dishes¹; students' research² etc.) and festivals (e.g. celebration of International Women's Day³; festival

¹ In 2016 the Committee for Sustainable Tourism worked on culinary heritage with a promotional campaign titled "Local Historical Dishes", designed and implemented in collaboration with local caterers. The aim was to showcase the diversity of traditional local cuisine, to promote networking among local culinary providers, further sustainable development and contribute to the preservation of local agriculture and landscape.

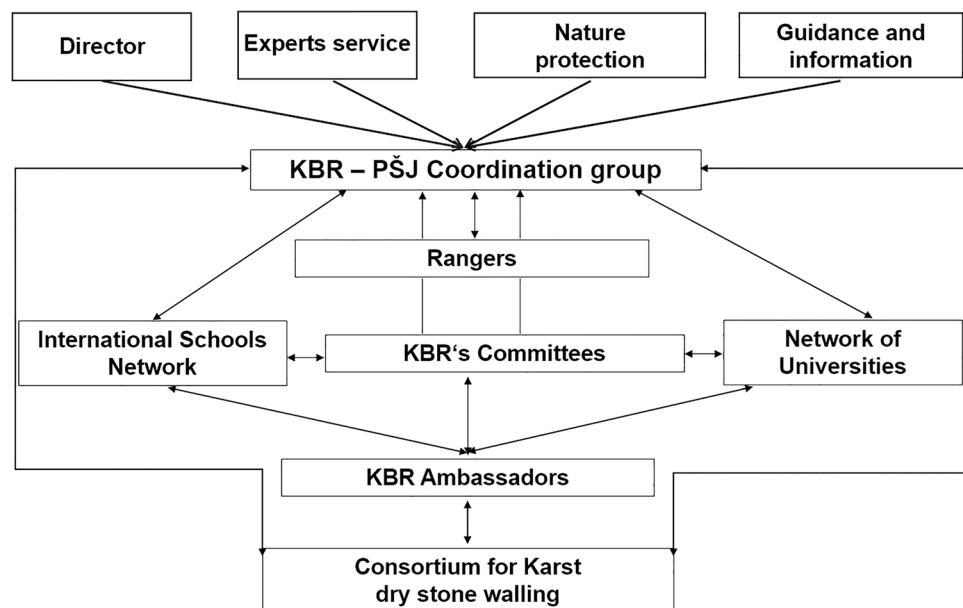
² Through ŠCP Network of Universities, the students are encouraged to carry out research related to the conservation and development of natural and cultural heritage.

³ The ŠCP International Network of Schools, formally established in 2003, aims to improve the quality and content of educational programs. Within this network, every school year the International Women's Day has been celebrated with educational projects implemented

Fig. 2 Location of the Karst Biosphere Reserve (Map by Borut Peric, Archive of ŠCP)



Fig. 3 KBR networking system (Diagram by Vanja Debevec, 2014, Archive of ŠCP)



"Belajtna"⁴) as a medium for engaging with stakeholders at different levels. The process of preparing various cultural

Footnote 3 (continued)

by schoolchildren, based on comparison of the past and present roles of women in society and at home. Children are encouraged to seek information from their grandparents. Such projects strengthen ties between generations and raise awareness of the bonds between people in the community and their land. <https://en.unesco.org/biosphere/eu-na/karst> (Accessed 9.8.2021).

⁴ Since 2007 the annual cave festival "Belajtna" has been organized under the name Škočjan Caves Park Day together with the local population and stakeholders. The event is based on the festival celebrated in the village of Matavun from about 1886–1946 and also builds on its philosophy. Starting from the idea of reviving and developing a historical event, it was easy to conceptualize with the local population and was quickly accepted by the local community.

activities based on traditional practices usually includes different phases that start with ethnographic research, including semi-structured interviews with local people, in which the interviewees talk about their life and experiences in the local community, in addition to their memories of past events. In this way, interviews are an important participatory method, allowing the researchers to hear different voices of local residents and get to know their problems, needs and experiences better. After collecting useful information, workshops, lectures and round tables are sometimes organized where local stakeholders as well as experts, entrepreneurs and other providers can deepen their thoughts, ideas and engagement. The main purpose of presented case studies is to outline ways of successful collaboration between local people and ŠCP staff in two main activities, where traditional knowledge of

Fig. 4 Villagers with ŠSP employees setting up a maypole traditionally ornamented with white, red and blue paper strips a day before the Belajtna festival (Photo by Jan Gombač, 2009, Archive of ŠCP)



the considerate use of natural resources and land as well as heritage practices were utilized as a powerful force for social sustainability, biodiversity protection, and the mitigation and adaptation to climate change (Fig. 4).

Case studies

Karst dry-stone walling

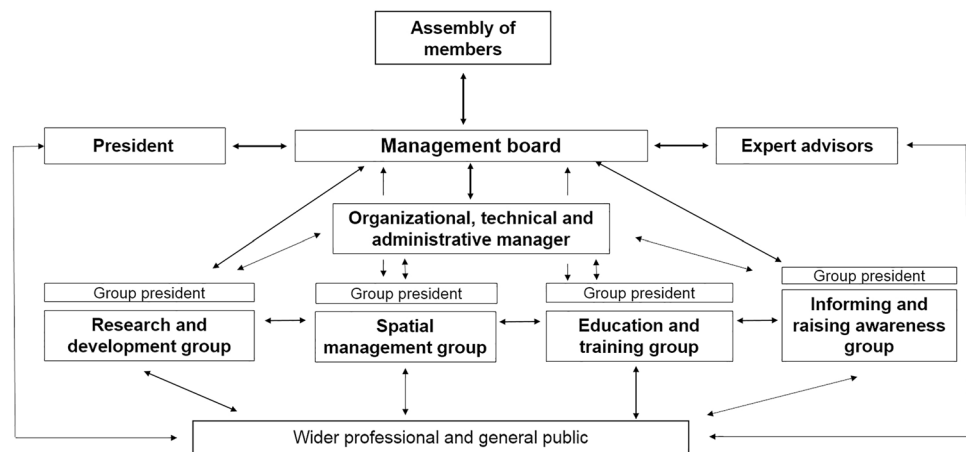
The cultural landscape of the Karst, a limestone plateau situated in western Slovenia and eastern Italy, is defined by numerous natural elements and processes (e.g. areas without water, underground waters, caves, the bora wind, karst commons (*gmajna*—a mosaic of meadows, former pastures and forest edges with botanical species), etc. Stone elements and structures (e.g. dry-stone walls, *hiške*—shepherds' cottages, dwellings made of stone, architectural details) have, owing to human creativity, become especially characteristic of the Karst and still give the Karst landscape its significant character. The importance of stone in the Karst area is indicated already in the classical name of the landscape; Carasudus, Mons Carasad or Karusad, Carsus and similar forms from Proto-Indo-European all derive from the lexical root 'ka(r)a/gara', which means 'stone' (Kranjc 1994). Stone has deeply characterized the lifestyle of the Karst people, since they historically lived in constant coexistence with nature using, adapting and exploiting natural resources for their survival. The arid stone landscape forced the Karst people to adjust greatly to natural resources and be innovative to build a life in what would today be considered difficult living conditions. All this has created a particular landscape image, one

that is changing and adapting to global socio-political and cultural processes, climatic changes, and local cultural characteristics (Hrobat Virloget et. al. 2015).

Experts have estimated that several thousand kilometers of dry-stone walls were built in the Karst without the use of binding materials, from stones obtained locally during the clearing and preparation of land (Belingar et. al. 2014). Archeologists suspect that the oldest dry-stone walls in the Karst area date back to the Neolithic period (Zupančič and Vinazza 2015). Mortar was introduced during the Roman period, but dry walls in their original form were still built outside settlements (Kranjc 2013). This practice continued until the end of the Second World War, when agriculture was abandoned since people found work elsewhere. This, in turn, completely changed the appearance of the Karst cultural and natural landscape. Arable land was no longer maintained and began to overgrow with vegetation. Drystone walls were no longer needed. The knowledge about the construction of dry-stone walls, which had been passed from generation to generation for thousands of years, nearly came to a standstill; only a handful of practitioners remained (Belingar and Kranjc 2019).

Then, at the turn of the twenty-first century, there was a phenomenon towards the revival of dry-stone walling in the Karst, followed by a planned complex movement to pass on the knowledge to younger generations, initiated by some locals to whom the traditional knowledge of dry-stone walling was passed on by their predecessors. The Škocjan Caves Park Public Service Agency (ŠCP) and its employees co-created the initial spontaneous phase of this movement with the organization of renovation workshops since 2003, within the framework of which 400 m of dry-stone

Fig. 5 The organizational structure of the Consortium for karst dry-stone walling (Diagram by Darja Kranjc, 2020, Archive of ŠCP)



walls have been renovated in the Park until 2020 according to the old method with the help of the local people. In 2011, the ŠCP Research and Development Department prepared an inventory of dry-stone walls in the protected area with their typology. In cooperation with the University of Ljubljana and the University of Primorska, the ŠCP collaborated, successfully applied for and carried out target projects with various activities, promotions, educational programs for children and adults, workshops for learning and a multi-part workshop for practical training of adult lovers of karst dry-stone walls, forming a bond with the Institute for the Protection of Cultural Heritage of Slovenia and other involved stakeholders. In 2015, on the occasion of the 10th anniversary of the implementation of the MAB program in KBR, The Partnership for Preserving and Popularising Karst Dry Stone Walling (the Consortium) in the larger cross-border Karst area between Slovenia and Italy was established (Fig. 5). The founding members are scientific, research and educational institutions, municipalities, other managing institutions, architectural offices, civil society groups, private institutions and individuals (Debevec and Kranjc 2019). The basic (MAB) philosophy behind the consortium is that the entire Karst society is needed for the preservation of Karst dry-stone structures. To create the conditions for a long-term transfer of knowledge, and agriculture is no longer an option, it seemed necessary to find a place for these constructions in modern society that is not only aesthetic. To achieve this, an interdisciplinary approach was required (Belingar and Kranjc 2019).

The work of the consortium quickly led to great success: within three years of its founding, dry-stone walling was inscribed in the National Register of Intangible Cultural Heritage, as well as UNESCO's Representative List of the Intangible Cultural Heritage of Humanity (UNESCO 2018) together with Croatia, Cyprus, France, Greece, Italy, Spain and Switzerland (Debevec and Kranjc 2019). The UNESCO inscription argues that dry-stone constructions are

inseparably linked to the sustainable organization of rural areas. If their original purpose was the disposal of accumulated stone, the mixture of different dry-stone walling constructions in the karst landscape (walls, shelters, huts) supported and improved agricultural production and animal husbandry and created favorable soil and weather conditions (Kranjc 2020). But despite the long tradition on Karst in nowadays Slovenia, dry-stone walls and other constructions of this type are no longer built for agricultural purposes. The modern reasons for their preservation arise from the protection of cultural heritage and nature conservation legislation, and the related professions. Outside the legal framework, increasing numbers of experts claim dry-stone walls are needed as a modern sustainable/ecological, carbon-footprint-low and energy-saving construction technique that contributes to maintaining an environment worth living in. Furthermore, dry-stone walls and everything related to this practice contribute to addressing the problem of biodiversity loss. Their high biodiversity function derives from the specific microclimatic conditions, and from the fact that they provide protection for several plant and animal species, with reptiles being particularly important (Standards of karst drywall construction 2015). Moreover, dry-stone walls represent an important symbol for the maintenance of ancestral relationships, strengthening local Karst identification processes and building coherent local communities (Belingar and Kranjc 2019; Kranjc 2020), whose members still actively participate in the renovation of old dry-stone walls in karst villages or the construction of new ones under the guidance of consortium members and experts (Fig. 6).

(Dynamic) water (supply) system

At the beginning of the twenty-first century, karst ponds called the *kali* were also recognized as an important habitat and network of water biotopes around the dry karst landscape. Prior to the development of an organized water

Fig. 6 Children from the Sežana kindergarten admiring dry-stone wall flora during a heritage sensitization workshop of the Consortium for karst dry-stone walling (Photo by Mojca Može Škapin, 2016, Archive of ŠCP)



supply system that facilitated access to drinking water in the Karst villages and households, the population largely relied on natural and artificial collection of rainwater. Given the scarcity of water in karstic areas and the fact that there is generally more water underground than on the surface in the karst, people had to have a very good knowledge of the environment and the terrain to use water from natural reservoirs of different shapes and sizes (Crnko et al. 2015). It is unknown when exactly people first began building artificial ponds. It is believed that humans were initially simply trying to hold back rainwater that had collected in the natural depressions for as long as possible. They noticed that soil and mud, accumulated in the karst depression due to surface runoff of rainwater, formed an impermeable layer, and used this knowledge to build *kali* (Belingar 2007). *Kali* were used in local agriculture, mainly for watering livestock. In many places, water from a *kal* was also used for the production of slaked lime, ice production and fighting fire. They also served as meeting places for villagers to socialize and for children to learn to swim and ice skate (Maher 2007). Until the construction of watertight and hygienically irreproachable water tanks, *kali* with different degrees of water purity were used by households as well (Belingar 2007) (Fig. 7).

When agriculture was abandoned in the decades after the Second World War, this also had a major impact on the abandonment of *kali*. The first initiative for their preservation came from nature conservationists who, through various local and national projects, succeeded in preserving and improving the network of ponds located in the Karst, thus

protecting the amphibian population. With the exception of the *Proteus*, which lives underground, Karst amphibians have survived only thanks to the network of water biotopes (ponds). The various dissemination and information activities included the participation of citizens in different Karst villages in the restoration and conservation of the ponds. In some villages, the locals created thematic paths of natural and cultural heritage, reminding visitors of the curious karst ponds resonant with the beauties of the rocky region where stone and man lived together in the past, and where the most beautiful karst flower – the vine – grows, diligently cultivated by the hands of the locals. Unlike historically, the *kali* are now an important meeting place for the people to enjoy nature or explore the outdoors and escape from the hustle and bustle of everyday life. An educational program around the ponds allows everyone to discover the interactions between culture and nature. Although they are man-made, they provide an important habitat for countless species and maintain healthy populations. They also remain an important water supply in case of drought or fire.

Ponds were once also very important to humans, but later on replaced by the building of wells on which the evaporation of water has no effect, and in which the water is cleaner. Therefore, alongside the *kali*, wells can also be reused as additional sustainable water sources in the Karst in the increasingly warmer future (Fig. 8). They are another timeless traditional solution that can be found in the treasuries of cultural heritage around the globe since antiquity (Belingar 2012). The traditional dry-stone Karst well was filled

Fig. 7 One of the restored karst hollows called “kali” in Lasatke near the village of Pared in the buffer area of KBR (Photo by Darja Kranjc, 2008, Archive of ŠCP)



Fig. 8 Karst well with stone gutters in the medieval village of Štanjel (Photo by Borut Lozej, 2019, Archive of ŠCP)



with rainwater collected directly from gutters that supplied it from the surrounding roofs and filtered it through a container filled with gravel and charcoal before it reached the cistern. In the Karst they came into use quite late, around the same time as the first water distribution systems. They are documented from the middle of the nineteenth century on (ibid). Most of the domestic wells, though, were built between the two world wars and after the Second World War. In the recent period, electric pumps or hydrophores were installed on wells that were already built using concrete (ibid). The reason for this is that the first water distribution

systems in the Karst, built between the middle of the nineteenth century and the First World War, covered only limited areas using different water sources. It was not until 1980 that speleologists finally found a sufficient underground water source capable of supplying enough water for the entire Karst region (Korošec 2015). Until then, the wells were an equivalent water source for the vast majority of households in the Karst. Perhaps due to the late introduction of the Karst aqueduct, or the proverbial austerity of the traditional local culture, middle-aged and elderly people in the Karst still use drinking water very carefully and sustainably in their daily

lives, with private wells often still being used for washing and irrigation, or even as a source of drinking water (Belingar 2012). In the future, such practices and mentalities could be of general advantage to humanity.

Discussion

According to the climate change assessment of the Slovenian Environmental Agency for the period until the end of the twenty-first century the average air temperature, heat load, number of hot days, number and duration of heat waves, top soil layer temperature, length of the growing season, precipitation, evotranspiration and annual groundwater volume will increase in Slovenia (Dolinar 2018). Local residents, especially young people, local decision makers, experts, and other visitors to the Karst should therefore learn about traditional sustainable use of natural resources, as it can help to mitigate current environmental and climate issues. Practical experience, like educational workshops of making dry-stone walling or making ponds, should be an important educational and tourist activity, spreading awareness of the benefits of natural ecological resources, the importance of their sustainable use, and the possibilities of combining different traditional and modern technological solutions. This way the traditional knowledge, which developed as an adaptation of human life to the natural resources (including the climate), can again be used as an efficient adaptation to climate change. Work of the Consortium for dry-stone walling and ways of renovation of karst ponds – kali and wells shows possible ways of how to use local heritage to combat with contemporary development issues (scarcity of drinking water and global warming) and activate different human energies to relive traditional knowledge to address SGDs. Besides, the revitalization of dry-stone walls contributes to the traditional conservation of biodiversity, which European ecological network of protected areas (Natura 2000), established to ensure the survival of Europe's most valuable species and habitats (Kras 2000; Lukežič et al. 2004).

The key question in using cultural heritage for development purposes is how to identify which specific remnants from the past carry development potential for sustainable growth and to meet the goals of 2030 Agenda of Sustainable development. How could be modified or improved to meet contemporary needs, lifestyles and technological developments? Potentially, they can be analyzed by experts in cooperation with the local population, using different participatory approaches (like interviews, workshops, lectures, cultural events), to establish which cultural resources from the past (e.g. traditional knowledge) are still alive among local residents, have positive value and function, what the locals appreciate and already use. Usually, the nature of elements of the past that are valued and appreciated by

experts, locals, politicians, and entrepreneurs depends on the current situation (development and technological challenges, social circumstances, state of the nature resources preservation, educational level, historical situation, etc.). If some elements are positively valued and appreciated by different stakeholders, or if there are still bearers of specific traditional knowledge (such as traditional knowledge about building dry-stone walls or karst ponds) who would like to present and teach the younger generation, it is worth actively involve them in the activities from the very beginning of the development projects. In this way, the knowledge, experience, ideas, and energy of the locals are usefully used and taken into account in the development activities, and participatory approaches are achieved. In this way collaboration, networking or partnerships can connect the bottom-up and top-down approaches, which means to take into account the needs of those in power and those affected by the decisions of authorities (Pogačar 2019). Due to the difficulty of constructing and carrying out participatory approaches and networks in practice, as they include complex and often difficult negotiations as well as power relations, a cultural mediator (cultural driver, facilitator, etc.) should be involved as well (Blake 2009). In the presented case studies, experts from ŠCP are engaged as mediators between different groups of actors, especially between researchers, local politicians, and the local population. Important insight is also that the expert should not be an "all-knowing teacher". The hierarchical approach is unsuitable in participatory approaches. Another possible way of informing and educating the locals regarding the use of traditional knowledge is active cooperation between experts and members of various local associations (NGOs) working in different cultural practices or areas that are already involved in discovering the local past, reviving old rituals, making intergenerational ties etc. Since active members of associations already have a positive attitude towards local history and consequently towards their environment, they are more receptive of acquiring additional knowledge about the ways of using heritage for sustainable development. The presentation of their activities and products to a wider public can also serve as a reminder for people who are not interested in this topic for a variety of reasons. However, working on the development potential of culture and its heritage requires long-term activities. It involves step-by-step actions that tend to bring results only after five or more years of activity.

Conclusion

Environmentalists and natural scientists should be aware that a well-documented and studied cultural heritage, which includes tangible and intangible remnants of the material, social and spiritual folk cultural practices of communities,

can be a salient source of knowledge for the conservation and sustainable use of natural resources. In addition, cultural and heritage practices enable new knowledge, tools, opportunities, and approaches for the fostering of participatory management of the environment and the cultural landscape, general wellbeing and sustainable protection of biological and cultural diversity. The presented case studies from the Karst region in Slovenia (Europe) argue that local people are willing to participate in heritage activities; they are more and more aware of its social and environmental potentials to mitigate current socio, economic and environmental development. Therefore, the basic and applied natural sciences should be striving to implement or upgrade traditional knowledge within practices or innovative solutions aimed at achieving the objectives of 2030 Agenda for Sustainable development, but they require support from the local politicians, heritage researchers, and experts as well as public institutions like the Škocjan Caves Park Public Service Agency.

According to the authors' experience, working with local people is not an easy process, but a well-integrated, informed civil society can defend the natural and cultural environment against unwise political and economic decisions. The presented case studies also show that cultural heritage in new understandings refers not only to tangible elements (buildings, paintings, historical monuments, etc.) but also to intangible elements such as traditional knowledge, skills, values, memories, the character of the place, customs, legends, etc. Locals are generally not conscious that their life experiences, memories and ancestral knowledge can indeed provide important and useful guidelines for sustainable living. For this reason, heritage institutions, museums, research institutions as well as Regional Parks must organize different dissemination and communication activities (lectures, round tables, discussion evenings, documentary films, educational programs etc.) to present different targeted groups (young people, adults, professionals etc.) as to why their life experiences and knowledge are vital indications concerning the challenges of contemporary development.

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