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Front cover photography: Common lands, like the pastures around Čadrg, reflect socio-economic change in the landscape. Their conservation and successful management are crucial for preserving local culture and biodiversity and supporting sustainable development (photograph: Jure Tičar).

Fotografija na naslovnici: Skupna zemljišča, kot so pašniki v okolici Čadrga, so odsev družbeno-gospodarskih sprememb v pokrajini. Njihovo vzdrževanje in uspešno upravljanje sta nujni za ohranjanje lokalne kulture ter biotske raznovrstnosti in zagotavljanje trajnostnega razvoja (fotografija: Jure Tičar).

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SPECIAL ISSUE

*The role of traditional, transforming
and new commons in landscapes*

POSEBNA IZDAJA

*Vloga tradicionalnega, preobraženega
in novega skupnega v pokrajinah*

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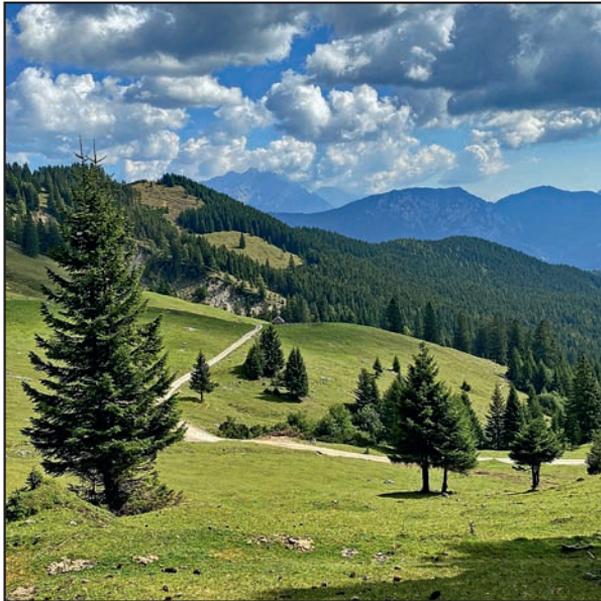
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COMMONS, COLLECTIVE ACTIONS AND LANDSCAPES: A SHORT INTRODUCTION

Mimi Urbanc, Keiko Hori, Mateja Šmid Hribar



MIMI URBANC

The Tegošče Pasture in the Karawanks in NW Slovenia is an example of food commons.

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Mimi Urbanc¹, Keiko Hori², Mateja Šmid Hribar¹

Commons, collective actions and landscapes: A short introduction

ABSTRACT: In the face of worldwide population growth, increasingly intensive agriculture, depopulation of marginal and less favoured areas, and growing rural-urban migration, two contrasting trends are becoming more pronounced: land abandonment on one hand and intensification of agricultural land on the other hand. Considering the complexity of mentioned issues, which result in landscape impoverishment, biodiversity loss, and a decline in crucial ecosystem services, it is essential to prioritise sustainable governance and management of landscapes and natural resources. Alternative approaches are needed to address these challenges. In this special issue, we focus on the potentials of commons and collective actions in sustaining landscape management and natural resource governance. The term »commons« refers to the way communities collectively manage local resources. Collective action refers to the coordinated efforts and cooperation of a community.

KEY WORDS: sustainable governance, management, landscapes, natural resources, alternative approaches, commons, collective actions

Skupno, skupnostne prakse in pokrajine: kratek uvod

POVZETEK: Zaradi rasti prebivalstva na globalni ravni, vse bolj intenzivnega kmetijstva, praznjenja obrobnih in za življenje manj ugodnih območij ter naraščajočih selitev s podeželja v mesta sta vse bolj izrazita dva nasprotujoča si trenda: opuščanje zemljišč na eni strani in povečanje intenzivnosti kmetijstva na drugi strani. Upoštevač kompleksnost omenjenih problemov, ki vodijo v siromašenje pokrajine, izgubo biotske raznovrstnosti in upadanje bistvenih ekosistemskih storitev, je jasno, da sta trajnostno upravljanje ter gospodarjenje s pokrajinami in naravnimi viri nujna. Za reševanje omenjenih izzivov so potrebni alternativni pristopi. V tej posebni številki se osredotočamo na možnosti, ki jih nudijo skupno in skupnostne prakse pri trajnostnem upravljanju pokrajin in naravnih virov. Izraz »skupno« se nanaša na način, kako skupnosti družno upravljajo z lokalnimi viri. Kolektivni ukrepi pa se nanašajo na usklajena prizadevanja in sodelovanje skupnosti.

KLJUČNE BESEDE: trajnostno upravljanje, gospodarjenje, pokrajina, naravni viri, alternativni pristopi, skupno, kolektivni ukrepi

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1 Introduction to the commons, collective actions and landscapes

In the face of population growth on the global level, increasingly intensive agriculture, land abandonment, depopulation of marginal and less favoured areas and growing rural-urban migration, the sustainable governance and management of landscapes and natural resources has become an urgent priority (Šmid Hribar et al. 2023). Especially, because mentioned development leads to two contrasting trends: land abandonment on one hand and intensification of agricultural land on the other hand. Both processes result in landscape impoverishment, biodiversity loss and a decline in essential ecosystem services (Hashimoto et al. 2018; Williams et al. 2020; Ribeiro and Šmid Hribar 2019). Alternative approaches are needed to address these challenges (Landis 2017). In this special issue, we focus on the significance of commons and collective actions in sustaining landscape management and natural resource governance.

The term »commons« originates from mediaeval Europe as a legal term for shared property. It refers to the way communities and »commoners« collectively managed local resources collectively. The meaning of commons has evolved to encompass a wide range of shared natural and cultural resources (Anderies and Janssen 2013). Other related terms are »common property regime« and »common-pool resources« (McKean 2000; Hirokawa 2013). The latter are natural resources that are vulnerable to degradation and where it is difficult to exclude individuals or groups from accessing or using the resource. These two characteristics require prudent governance and management. Collective action, in the context of common land governance, refers to the coordinated efforts and cooperation of community members who have a stake in the management and decision-making processes related to the common land (Dowding 2013).

Commons based on community-based resource management and collective actions, offer a promising avenue for addressing the complex interplay between landscapes, natural resources and socio-economic processes (Šmid Hribar, Bole and Urbanc 2015; Šmid Hribar et al. 2023; Tucker et al. 2023). In this context, commons stand for the shared access, use and stewardship of natural resources by specific communities or user groups (Šmid Hribar et al. 2023). The inclusion of traditional and transforming commons opens up new opportunities. Moreover, the emergence of new commons in both rural and urban areas provides a fresh perspective on community-based resource management (Šmid Hribar, Urbanc and Zorn 2023). These new commons may emerge from grassroots initiatives, citizen movements or collaborative governance structures that recognise the importance of local engagement, participatory decision-making and the integration of diverse perspectives. Exploring the characteristics and outcomes of various forms of commons offers insights into their potential as effective tools for sustaining landscape management.

Effective natural resource governance is a crucial aspect of sustainable landscape management (Martin and Williams 2016). Understanding the relationship between people, commons and natural resource governance can shed light on the institutional arrangements, policies, and frameworks needed to support and scale up successful practices. By examining the governance structures and processes that underpin successful commons, we can identify strategies to overcome governance challenges and promote inclusive, participatory, and sustainable approaches to landscape management.

Finally, exploring the role of commons and collective actions in building community resilience is of utmost importance. Resilience to environmental and socio-economic shocks is critical to the long-term sustainability of landscapes and the well-being of local communities (Klein et al. 2019). By delving into the ways in which commons and collective actions contribute to community resilience, we can uncover strategies and practices that enhance adaptive capacity, social cohesion, and sustainable livelihoods.

2 Special issue contribution to the field of commons, collective actions and landscapes

Despite the potential of commons and collective actions, their implementation faces challenges related to governance, policy frameworks, and power dynamics (Laerhoven 2010). This requires a deeper understanding of the framework, institutional arrangements, and social processes that facilitate their effectiveness and sustainability (Ombogoh et al. 2018). By examining case studies, theoretical frameworks, and practical experiences, we can further explore the significance of commons and collective actions in the context of sustainable landscape management and natural resource governance. This is precisely the aim of this special issue – to explore the concept of commons and collective action as a basis for sustainable landscape

management and as a potential governance strategy. We have sought contributions that explore and highlight different forms and practices within the field of commons and collective action, particularly in relation to landscapes.

The articles in this special issue focus on different aspects of commons in rural and urban areas, drawing on a wide range of case studies from various countries and resource systems. Through these diverse examples, we aim to shed light on the effectiveness and applicability of commons and collective actions in different contexts.

The contributions include a variety of case studies and offer insights from Slovenia, Portugal, Slovakia, and a cross-national comparative analysis covering ten countries (Belgium, France, Germany, Greece, Hungary, Italy, the Netherlands, Norway, Slovakia, and Spain). These case studies provide a comprehensive understanding of the challenges and opportunities associated with commons and collective actions across different sociocultural, economic, and environmental contexts. The examined case studies primarily focus on rural areas, highlighting the importance of sustainable land use and resource management. The resource systems explored encompass various elements/land uses of landscapes, such as pastures, forests, and urban greeneries. Additionally, the articles address the role of commons and collective actions in governing and managing water resources, recognizing the critical significance of sustainable water management.

The study by Šumrada and Erjavec (2023) examines farmers' preferences for cooperation in agri-environmental policies in Slovenian agriculture. It highlights the challenges posed by low willingness to cooperate and limited research on access to agricultural policy funds. The importance of spatial coordination and engagement at the individual level is highlighted, with the potential involvement of third-party organizations. While the collective bonus is seen as less important, knowledge transfer and Common Agriculture Policy (CAP) cooperation measures to promote farmer cooperation are recommended.

The study by Nogueira et al. (2023) examines the role of Portuguese common lands (pt. *baldios*) as traditional commons in landscape and resource governance. The restoration of communal rights has empowered local communities, ensuring the continuity of agroecosystems in certain villages. However, rural depopulation and land abandonment have led to the decline of commoner's organisations and ecosystem service losses in other contexts. The study highlights the need for innovative practices and improved rules to adapt to changing conditions, with a focus on community-building and non-individual benefits. Collaborative networks and learning among communities and local managers, facilitated by regional governance actors, are critical to resilience and success.

The research by Bogataj and Krč (2023) examines the response of private forest owners to large-scale forest damage in a karst region of Slovenia between 2014 and 2016. Using a quantitative and qualitative analysis of management data, the study shows that forest commons exhibit rapid and efficient response times and harvesting practices. The significance of local norms and forest management competences is highlighted as a key factor in the response. The study contributes to filling a knowledge gap regarding the adaptation of socio-ecological systems to climate change. It highlights the potential of forest commons for active forest management and calls for cooperation between private and public institutions that combines economies of scale with traditional knowledge and local social norms.

The study by Renes, Kruse and Potthoff (2023) explores the relationship between transhumance and commons in rural and urban areas. Commons play a central role in access to land for transhumance, both in rural and urban contexts. The article highlights the significance of commons for transhumance through the provision of grazing resources and discusses the need for increased efforts to support transhumance. The study demonstrates the adaptability of transhumance in the 21st century, including landscape management and urban transhumance. The role of commons in facilitating access to land and the call for sustainable land governance to address the challenges of climate change are expressed. Efforts to improve economic conditions, raise awareness and educate are essential for the future of transhumance.

The contribution by Pašová and Machničová (2023) examines the role of land associations as a form of collective action contributing to community resilience in Slovakia. The study assesses the transformation processes of common lands and investigates whether land associations effectively address land conflicts. The results show that collective actions have the potential to maintain landscape resilience, but there are two hindering factors: legal frameworks, which are often barriers, and lack of motivation among land association founders and owners to use common land. Concrete government measures are proposed to unify and streamline activities: the creation of a functional Land Associations Register, the introduction of economic instruments such as subsidies, and the clarification of legal provisions and members' rights and

obligations. Despite their anachronistic legal form, land associations, demonstrate significant potential to promote activities in the public interest and build community resilience.

The study by Šmid Hribar, Urbanc and Zorn (2023) investigates the role of commons and collective actions in sustaining cultural landscapes in Slovenia. Using a questionnaire, 21 collective actions related to cultural landscapes were analysed. The results show that traditional and transforming commons are primarily focused on forests and pastures, while new commons include more diverse land uses, but on a smaller scale. New commons point to potential future mechanisms, but currently have limited impact on cultural landscapes. The main benefits of commons are social, followed by non-material and regulative benefits, with material benefits in second place. Urban commons face challenges in obtaining land resources and therefore need the support of decision-makers. The findings can help policy makers to develop initiatives and incentives to manage and sustain cultural landscapes, nature reserves and urban green areas, and to preserve biodiversity.

The study by Pipan, Šmid Hribar and Urbanc (2023) examines the governance, robustness and benefits of water commons, specifically focusing on small-scale drinking water supply systems. Based on Ostrom's Design Principles and Social-Ecological Systems Framework, two water commons in Slovenia are analysed to identify drivers and motivations for successful water governance, assess the robustness of water commons in the face of challenges, and identify material, non-material, regulative, and social benefits. The findings highlight that shared interests and strong commitment are key elements for effective water management. In addition to material benefits such as water supply, non-material benefits such as community building and identity are also important. Policy implications include promoting local collective actions and creating interdependencies between the local and municipal levels.

In this special issue, we aim to delve into the multiple aspects of commons and collective actions, and their implications for sustaining landscape management and natural resource governance. By analysing the strengths, limitations and potential synergies between traditional self-governing systems, local practices, and modern approaches, we sought to contribute to the growing body of knowledge on this topic. Through this contribution, we hoped to provide insights and recommendations for policy makers, practitioners and researchers concerned with sustaining landscape management and natural resource governance.

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3 References

- Anderies, J. M., Janssen, M. 2013: *Sustaining the Commons*. Tempe.
- Bogataj, N., Krč., J. 2023: Towards the efficient response of forest owners to large-scale forest damage: An example of forest commons. *Acta geographica Slovenica* 63-3. DOI: <https://doi.org/10.3986/AGS.11084>
- Dowding, K. 2013: Collective action problem. *Encyclopedia Britannica*. Internet: <https://www.britannica.com/topic/collective-action-problem-1917157> (20. 1. 2021).
- Hashimoto, S., Dasgupta, R., Kabaya, K., Matsui, T., Haga, C., Saito, O., Takeuchi, K. 2018: Scenario analysis of land-use and ecosystem services of social-ecological landscapes: Implications of alternative development pathways under declining population in the Noto Peninsula, Japan. *Sustainability Science* 14-1. DOI: <https://doi.org/10.1007/s11625-018-0626-6>
- Hirokawa, Y. 2013: *The exploration of a new commons adapted to modern society*. Commons & Public Space. Kyoto.
- Klein, J., Tucker, C. M., Steger, C., Nolin, A., Reid, R., Hopping, K., Yeh, E., et al. 2019: An integrated community and ecosystem-based approach to disaster risk reduction in mountain systems. *Environmental Science & Policy* 94. DOI: <https://doi.org/10.1016/J.ENVSCI.2018.12.034>
- Laerhoven, F. 2010: Governing community forests and the challenge of solving two-level collective action dilemmas – A large-N perspective. *Global Environmental Change* 20-3. <https://doi.org/10.1016/J.GLOENVCHA.2010.04.005>
- Landis, D. 2017: Designing agricultural landscapes for biodiversity-based ecosystem services. *Basic and Applied Ecology* 18. DOI: <https://doi.org/10.1016/J.BAAE.2016.07.005>

- Martin, P., Williams, J. 2016: Next generation rural natural resource governance: A careful diagnosis. *Legal Aspects of Sustainable Development*. Cham. DOI: https://doi.org/10.1007/978-3-319-26021-1_30
- McKean, M. A. 2000: *Common property: What is it, what is it good for, and what makes it work? People and Forests: Communities, Institutions, and Governance*. Cambridge. DOI: <https://doi.org/10.7551/mitpress/5286.003.0008>
- Nogueira, J., Araújo, J. P., Mamede Alonso, J., Simões, S. 2023: Common lands, landscape management and rural development: A case study in a mountain village in northwest Portugal. *Acta geographica Slovenica* 63-3. DOI: <https://doi.org/10.3986/AGS.11081>
- Ombogoh, D., Tanui, J., McMullin, S., Muriuki, J., Mowo, J. 2018: Enhancing adaptation to climate variability in the East African highlands: a case for fostering collective action among smallholder farmers in Kenya and Uganda. *Climate and Development* 10. DOI: <https://doi.org/10.1080/17565529.2016.1174665>
- Palšová, L., Machničová, Z. 2023: Common lands as a system of joint management to contribute to community resilience? Case from Slovakia. *Acta geographica Slovenica* 63-3. DOI: <https://doi.org/10.3986/AGS.11102>
- Pipan, P., Šmid Hribar M., Urbanc, M. 2023: Motivation, robustness and benefits of water commons: Insights from small drinking water supply systems. *Acta geographica Slovenica* 63-3. DOI: <https://doi.org/10.3986/AGS.11592>
- Renes, H., Kruse, A., Potthoff, K. 2023: Transhumance, commons, and new opportunities: A European perspective. *Acta geographica Slovenica* 63-3. DOI: <https://doi.org/10.3986/AGS.11097>
- Ribeiro, D., Šmid Hribar, M. 2019: Assessment of land-use changes and their impacts on ecosystem services in two Slovenian rural landscapes. *Acta geographica Slovenica* 59-2. DOI: <https://doi.org/10.3986/AGS.6636>
- Šmid Hribar, M., Bole, D., Urbanc, M. 2015: Public and common goods in the cultural landscape. *Geografski vestnik* 87-2. DOI: <https://doi.org/10.3986/gv87203>
- Šmid Hribar, M., Hori, K., Urbanc, M., Saito, O., Zorn, M. 2023: Evolution and new potentials of landscape commons: insights from Japan and Slovenia. *Ecosystem Services* 59. DOI: <https://doi.org/10.1016/j.ecoser.2022.101499>
- Šmid Hribar, M., Urbanc, M., Zorn, M. 2023: Commons and their contribution to sustaining Slovenian cultural landscapes. *Acta geographica Slovenica* 63-3. DOI: <https://doi.org/10.3986/AGS.11591>
- Šumrada, T., Erjavec, E. 2023: Will farmers collaborate to conserve biodiversity? The use of collective bonus in the High Nature Value farmland in Slovenia. *Acta geographica Slovenica* 63-3. DOI: <https://doi.org/10.3986/AGS.11015>
- Tucker, C. M., Šmid Hribar, M., Urbanc, M., Bogataj, N., Gunya, A., Rodela, R., Sigura, M., Piani, L. 2023: Governance of interdependent ecosystem services and common-pool resources. *Land Use Policy* 127. DOI: <https://doi.org/10.1016/j.landusepol.2023.106575>
- Williams, B., Grantham, H., Watson, J., Alvarez, S., Simmonds, J., Rogéliz, C., Silva, M., et al. 2020: Minimising the loss of biodiversity and ecosystem services in an intact landscape under risk of rapid agricultural development. *Environmental Research Letters* 15-1. DOI: <https://doi.org/10.1088/1748-9326/ab5ff7>

TRANSHUMANCE, COMMONS, AND NEW OPPORTUNITIES: A EUROPEAN PERSPECTIVE

Hans Renes, Alexandra Kruse, Kerstin Potthoff



Commons in France used for transhumance.

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Hans Renes¹, Alexandra Kruse², Kerstin Potthoff³

Transhumance, commons, and new opportunities: A European perspective

ABSTRACT: Transhumance is a form of livestock management including seasonal movement of livestock and people. Based on literature studies, interviews, field conversations and visits, this article aims to show the different ways in which transhumance practitioners currently manage land – which to a large degree is different types of commons – and to discuss opportunities for sustainable future land management. Transhumance has been declining especially since the mid-20th century. While new opportunities for transhumance practitioners have occurred, such as landscape management for biodiversity purposes and urban transhumance, efforts to support transhumance need to be reinforced. Commons play an important role in providing access to land in rural and – to a limited degree – in urban areas.

KEY WORDS: common land, climate change, cultural values, horizontal transhumance, sustainable land management, vertical transhumance, urban transhumance

Tranzimansa, skupna zemljišča in nove priložnosti: evropski vidik

POVZETEK: Tranzimansa (transhumanca) je oblika živinoreje, ki vključuje sezonsko selitev živine in ljudi. Avtorji v članku na podlagi pregleda literature, intervjujev ter pogovorov in obiskov na terenu predstavijo različne načine, s katerimi kmetje, ki se ukvarjajo s tranzimanso, trenutno upravljajo zemljišča (ki so večinoma v skupni lasti), in proučujejo priložnosti za prihodnje trajnostno upravljanje zemljišč. Tranzimansa intenzivneje zamira zlasti od srede 20. stoletja. Kljub novim priložnostim, ki se ponujajo njenim izvajalcem (npr. upravljanje pokrajin v namene ohranjanja biotske raznovrstnosti in urbana tranzimacija), bi bilo treba okrepiti prizadevanja, ki to dejavnost podpirajo. Skupna zemljišča imajo pomembno vlogo pri zagotavljanju dostopa do zemljišč na podeželskih in v manjši meri mestnih območjih.

KLJUČNE BESEDE: skupno zemljišče, podnebne spremembe, kulturne vrednote, vodoravna tranzimansa (transhumanca), trajnostno upravljanje zemljišč, navpična tranzimansa, urbana tranzimansa

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1 Introduction

Transhumance is a specific form of livestock farming. It is mobile with a regular, seasonal, cyclical long-distance movement, starting at a permanent farm and lasting several months (TRANSFARM 2022). We consider the presence of people who accompany the herds as crucial for a practice to be defined as transhumance. Terms such as vertical, horizontal, Mediterranean, and Alpine have been used to characterize different types of transhumance (Davies 1941; Liechti and Biber 2016; Colombino and Powers 2022; Filak and Gorišek 2022).

Vertical transhumance would typically occur in mountain regions where livestock is moved between low- and high-altitude pastures (TRANSFARM 2022). Davies (1941) uses the term 'Alpine transhumance' for this kind of transhumance which, however, also occurs in other mountain areas than the Alps such as in Scandinavia and the Carpathians. Davies (1941) applies the term 'Mediterranean transhumance' to specifically highlight the climatic conditions in that region resulting in a need to drive the livestock into the moist and cool hills during summer. Horizontal transhumance occurs in plains or plateau regions (TRANSFARM 2022). Besides differences in altitudinal range, the larger distances covered by horizontal compared to vertical transhumance are used to distinguish them (Colombino and Powers 2022; TRANSFARM 2022). However, experiences from the TRANSFARM-project (<https://transfarm-erasmus.eu/>) show that the diversity of transhumance practices throughout Europe challenges clear-cut definitions, for example, in terms of what is short and what is long (Potthoff, Fox and Kruse 2023). Movement of livestock – consisting of mainly sheep, cattle, and goats, but also horses, donkeys, and reindeer (TRANSFARM, 2022), either in herds of single breeds or mixed – occurs between different geographical, often also different climatic regions.

Historically, transhumance was practiced in most European countries (Collis, Pearce and Nicolis 2016). In some regions it seems to have evolved with the introduction of livestock while in others it occurred much later. For example, for the Southern French Alps, transhumance has been documented as early as the Neolithic, while in Northeast Iceland the practice did not occur before the Middle Ages (Collis, Pearce and Nicolis 2016). The history of transhumance shows a diversity of pathways reflecting that transhumance is a dynamic practice adapting to changing climatic, economic, political and social conditions (Gardiner 2018). A common feature is its decline especially during the second half of the 20th century (Collis 2016). This decline triggered research interest.

Until about the 1960s mainly disciplines such as geography and anthropology studied transhumance in areas as for example the Alps, Scandinavia, the Mediterranean and the Balkans (Reinton 1955; 1957; 1961; De Vooys 1959). The studies' aim was to document this disappearing practice of remote areas. More recently transhumance has become a research interest for other disciplines such as history, archaeology, and landscape ecology (Roc 1992; Olsson, Austrheim and Grenne 2000; Bunce et al. 2004; Mientjes 2008; Collis, Pearce and Nicolis 2016). Historical studies brought a new emphasis on transhumance as a historical process, influenced by political changes, and demographic and economic fluctuations. New regions such as Germany and in particular the British Isles were considered (Bowden and Herring 2021). Knowledge gained from historical, archaeological, (landscape) ecological and anthropological (Bindi 2022a) research has been important to highlight transhumance's cultural and ecological values.

Currently, transhumance is a prevalent (Liechti and Biber 2016; Bindi 2022a; Colombino and Powers 2022) but rarely noticed form of land use across Europe. According to Herzog et al. (2005, 82) 'more than 4 million ha of agricultural land depend on transhumance' in Europe. Transhumance provides a range of goods and services including high-quality food products, biodiverse and attractive landscapes, preservation of livestock breeds, fire prevention and carbon sequestration (Bunce et al. 2004; Herzog et al. 2005; Sickel et al. 2014; Liechti and Biber 2016; Sørensen et al. 2018; Bindi 2022b; Colombino and Powers 2022). Not at least does transhumance provide a form of social organization and complex knowledge system of how to sustainably manage resources (Bindi 2022a). The cultural and heritage values of transhumance have recently been acknowledged by the recognition of transhumance as intangible heritage for the countries Austria, Greece and Italy; first on national level and in 2019 by the UNESCO (UNESCO 2019). Further countries are in the process of joining the nomination, led by France. The recognition of transhumance as intangible heritage may also reflect recent efforts of raising awareness about transhumance as a traditional practice and knowledge system (Oteros-Rozas et al. 2013; Bele et al. 2021).

Cultural heritage, attractive cultural landscapes and high-quality products may provide economic opportunities in rural areas and thereby job alternatives. Employment opportunities can, for example, be related



MARTINA SLAMOVA

Figure 1: Commons in Slovakia used for transhumance.



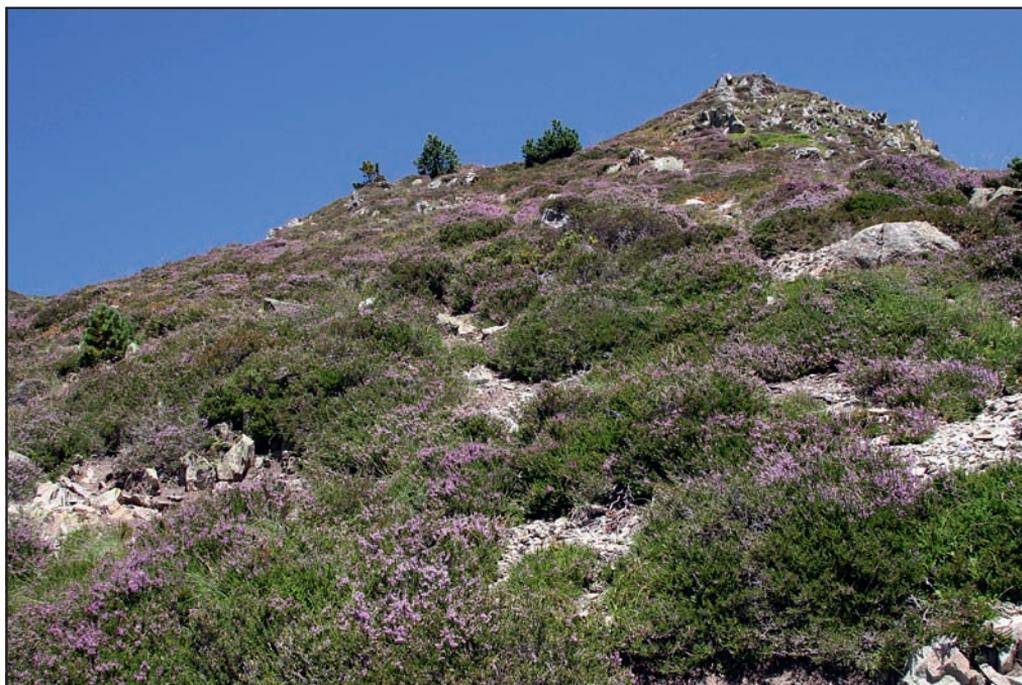
MARIA KARATASSIOU

Figure 2: Commons in Greece used for transhumance; the landscape appears very similar to the Spanish Dehesa.



IGNACIO ROJAS PINO

Figure 3: Commons in Spain used for transhumance creating Dehesa landscapes.



ALEXANDRA KRUSE

Figure 4: Commons in France used for transhumance creating heathlands.



Figure 5: Commons in Germany used for transhumance creating heathlands.

to transhumance as such, e.g. herder or cheese-maker, or take advantage of opportunities within tourism, e.g. provide accommodation, food or guided tours (Mastronardi, Giannelli and Romagnoli 2021; Colombino and Powers 2022; Filak and Gorišek 2022; Mannia 2022). Knowledge communication is also a tourism related employment opportunity (Belliggiano, Bindi and Ievoli 2021).

Commons, common land and common property are terms that in a similar way describe access to a common pool resource; however, terminology is ambiguous (Brown 2005; Kruse et al. 2010). Following Brown (2005, 29), we use the term commons 'to refer to any, or the sum total, of common-pool resources and governing regimes that include, are, or have been, common property, and those in transition to or from common property'. Historically commons have been widespread in Western Europe but have been declining due to, among other reasons, commercialisation, industrialisation, population growth and changes in legislation (Brown 2005). The cases of the Székely commons in Romania and agrarian communities in Slovenia illustrate that similar forces have been exerting pressures on commons in Eastern European countries (Potthoff et al. 2020; Hartmann, Bán and Barta 2022; Šmid Hribar et al. 2023). About 9% of the land area of Western Europe is still commons, and commons are often located in marginal and upland areas (Brown 2005; Brown 2006).

Mountain and upland pastures in Europe are in many cases commons, offering grazing resources to mainly farmers and herders (Figures 1–5). Ownership of these pastures may differ. For example, the pastures may be owned by the state, municipalities, inter-communal syndicates, local communities, several farms, or small and large private holders (Sevatdal and Grimstad 2003; Berge 2006; Brown 2006; Potthoff et al. 2020; Duclos and Fabre 2022; Toulze 2022).

The main aim of this article is to show the different ways in which transhumance practitioners currently manage land – which to a large degree is different types of commons – and to discuss opportunities for sustainable future land management by answering the following questions: What are current types and purposes of transhumance? What are important challenges for transhumance practitioners? What are needs of and opportunities for transhumance practitioners? Taking the departure in the results we consider the role of commons for transhumance's future in our discussion.

2 Methods

Empirical data were derived from the TRANSFARM project, an Erasmus+ funded project about vocational education and training for transhumance practitioners. The following countries were covered: Belgium, France, Germany, Greece, Hungary, Italy, the Netherlands, Norway, Slovakia, and Spain. The degree to which published material about transhumance was available differed among the countries. Moreover, information was not always comparable due to, for example, different definitions used in national statistics. Similar challenges have been reported by other studies comparing land use across national borders (Potthoff et al. 2020). To enable a comparison of transhumance, a catalogue of questions to explore the following themes was developed: current situation of transhumance (area used, extent, type of livestock, type and purpose of transhumance, available knowledge, awareness about transhumance, legal and funding situation), its history, values and meaning, needs, challenges, and offers for vocational education and training related to transhumance. In this article mainly data regarding the areas used, extent of transhumance, type of livestock, legal and funding situation, type, purpose, and challenges of transhumance will be presented (see Table 1 for the specific questions that were addressed).

Table 1: Questions for the themes: areas used, extent of transhumance, type of livestock, legal and funding situation, type, purpose, and challenges of transhumance.

Areas used

- In which parts of the country does transhumance currently take place?
- In which environments does transhumance currently take place (e.g., mountains or even specific parts of the mountains, plains, urban areas)?

Extent

- To which degree can transhumance currently be considered a common practice? (e.g., compared to what was common in the past in the whole country or specific regions, when comparing different regions)?

Kind of animals and produce

- What kind of animals are currently used for transhumance?
- What kind of products are currently produced (e.g., milk (unprocessed), cheese, meat, wool)?

Kind of transhumance

- What kind of transhumance is occurring in the country (e.g., long-distance movements, continuous movements, movement to one place)?
- Are there any distinct movement patterns?
- If yes, please describe.

Purpose of transhumance

- What is the purpose of transhumance (e.g., private business, professional business, landscape maintenance)?

Legal and funding situation

- Who owns the land used for transhumance?
- In case the transhumance practitioner does not own the land him-/herself, how does he/she acquire the right to graze on other people's land for both short stays (i.e., passing through) and longer periods (e.g., written or oral agreement, duration of agreement)?
- Does a transhumance practitioner who does not own the grazing land him/herself pay for the access to the land?
- What are the rules for using public roads and paths?
- Who is responsible for any kind of potential damage caused by livestock?
- Is there any funding available for transhumance practitioners?
- If yes, what is funded (e.g., specific activities such as using a specific type of area for pastures or support for having animals on a seasonal farm)?
- Who is providing the funding?
- Is there any funding available for loss of livestock?
- If yes, what kind of losses are funded?
- Who is providing the funding?

Challenges

What are challenges transhumance practitioners face who:

- Want to start a business?
 - Want to maintain and develop their business?
-

A selection of methods was used to collect the information needed to answer the questions. Literature studies were conducted in each country covering a broad selection of material, including books, articles, reports, and webpages. For a selection of references see Potthoff, Fox and Kruse (2023), for a complete overview see the national reports by Centuri (2022), Dreer and Kruse (2023), Ferrario, Rossi and Fabbrizioli (2023), Karatassiou et al. (2022), Potthoff (2022), Renes (2022), Sanchez (2022) and Slámová et al. (2022). Semi-structured interviews with stakeholders (shepherds, dairymaids/men, livestock owners, farmers, NGO, administration, seasonal farming, grassland management and landownership experts) were carried out to supplement the written material. Stakeholders were identified within the network of already existing contacts and snowballing was used to get into contact with further interviewees. Either the complete catalogue of questions was used, or selected topics were addressed to further explore issues that were insufficiently covered by literature. Altogether 42 interviews were conducted by the project partners – either in person, by phone or digitally. In person interviews took place in public meeting places, offices, at seasonal or main farms or outside. Dependent on if the complete catalogue of questions was considered or selected topics, the duration of the interviews varied between approximately 20 to 90 minutes. Eighteen field visits and informal conversations gave additional insights.

All data were organised in tabular form, sorted in accordance with the catalogue of questions. Common trends, similarities and differences among the countries were identified by comparing the results qualitatively.

3 Results

3.1 Current usages by transhumance practitioners

Despite its decline, transhumance is still practiced in all countries studied except for Belgium and the Netherlands (Figure 6). In both countries, horizontal transhumance occurred in the past. It was abandoned in the 20th century when distances between permanent farms and pastures could easily be covered by new modes of transport. In the Netherlands, the last shepherd moving with his herd died in the mid-20th century. However, his lifestyle was rather nomadic since he was continuously moving, and his livestock did not return to a permanent farm during winter.

The most common current movement is vertical movement from low-altitude pastures or stables at permanent farms to high-altitude pastures at seasonal farms during summer. This kind of movement occurs, for example, in the Alps, the Pyrenees, and the Scandinavian mountains (Figure 7). Dependent on altitude and availability of grazing resources a stay at intermediate altitude can be added, such as in France and Germany. In Norway, an intermediate stay was common in some parts of the country but is not practised anymore. Commonly, the permanent farm is located in the lowlands while summer pastures are in high-altitude areas. However, a reverse movement (i.e., movement to low-altitude pastures in winter) occurs as well. For instance, in the Massif Central herds are moved to lower altitudes during winter to graze, for example, vineyards. The length of the vertical movement varies strongly: Distances can be rather short, e.g., from the valley floor to the high-altitude areas; however, livestock can be moved more than 200 km. Travel distances in Greece show that summer pastures within one country can be located at a broad range of different distances – between up to 50 km and more than 200 km.

Recent modifications of these rather traditional movement patterns enrich the diversity of transhumance practices within the countries. Due to a declining interest in high-altitude pastures, herders in Northern Italy have started to move throughout the whole year. They stay in the lowlands for winter grazing and in the high-altitude areas for summer grazing but are continuously moving among pastures. An increase in movements has been reported from Slovakia as well. Livestock is moved from pasture to pasture during summer instead of staying in one location.

Horizontal transhumance seems currently to be less common. It occurs in Germany, Hungary, and France. In France salt marshes are for example used as summer pastures. A more recent development with horizontal transhumance is transhumance in urban and peri-urban areas occurring in France and Spain and starting in Germany (Figure 8). Herds accompanied by herders move along shorter routes through both public and private land, such as parks, dykes, and protected areas.

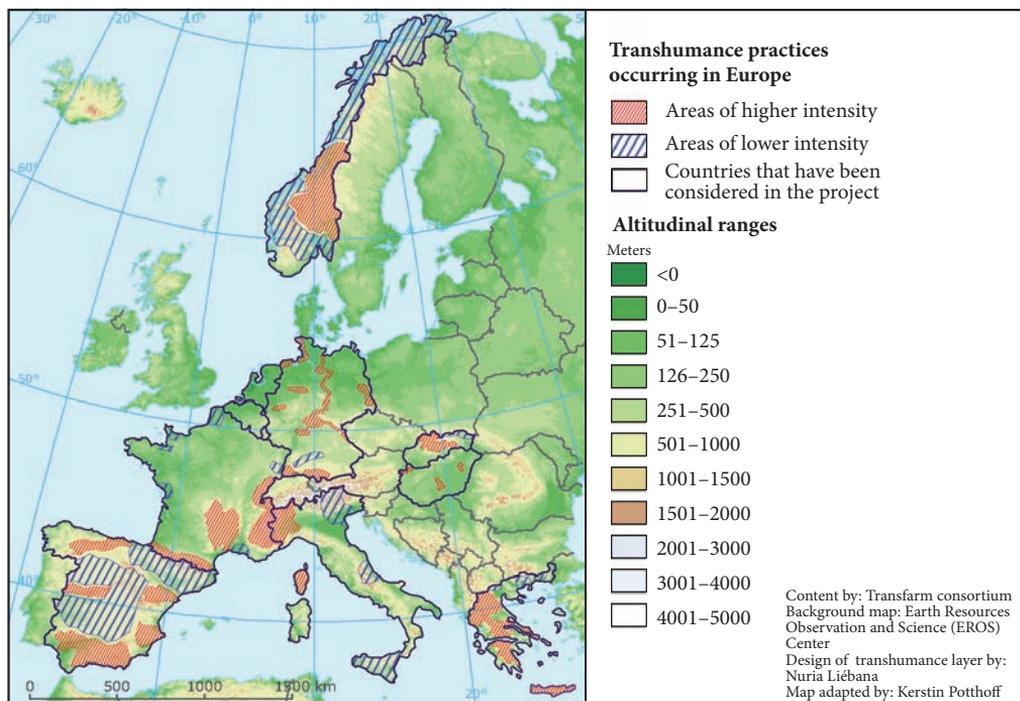


Figure 6: Current extent of transhumance based on aggregated national data (Source: Potthoff, Fox and Kruse (2023), adapted).



Figure 7: Vertical transhumance depends on seasonal farms as for example in Norway.



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Figure 8: Urban transhumance in France.



MARIA KARATASSIOU

Figure 9: Livestock moved with a truck in Greece.



ALEXANDRA KRUISE

Figure 10: Movement on foot in France: festive bringing down of the flock in autumn.

Movement by vehicles (Figure 9) is dominating, while movement on foot has declined (Figure 10). The decision which means of transport to use may depend on distance, costs and practicability. Some Greek farmers chose to move livestock on foot only when returning from the summer pastures. The downhill movement is easier for the livestock than uphill, and the livestock is not milked anymore.

We acknowledge that transitions to practices occur where livestock to a small degree is accompanied by people or not at all. For example, in the Netherlands shepherds move their livestock among pastures but spend their night at home. While this kind of practice was excluded from the definition of transhumance used for this study it may be very important for management of common land in a future perspective and may also provide an opportunity to revive transhumance (see Discussion).

3.2 Purposes of transhumance

Transhumance is commonly a private business. Using pastures in common grazing areas, requires cooperation and organization among these businesses. For example, in Norway, mountain pastures may be owned by several farms. Resource use is based on agreements established through practice since time immemorial. In France, collective pastoral associations organize transhumance and grazing. Mountain pastures in Greece are state-owned and grazing rights are sold on auctions on a yearly basis.

While food and fibre production for own consumption and sales was the most important purpose of transhumance in the past, landscape management is a more recent purpose. Landscape management is carried out to maintain the biodiversity of transhumance landscapes and their aesthetic qualities. The production and processing of milk and meat are still important, and products are appreciated for their quality, but the importance of practicing transhumance for management purposes seems to increase (Figure 11). For example, in Hungary and Slovakia most transhumance activities are carried out for management purposes. In Hungary, livestock used for these purposes may even be owned by National park directorates. In addition, the development of urban transhumance as a way of maintaining grassland and green

infrastructure in public urban areas in a sustainable – especially chemical-free – manner, reflects the increasing importance of transhumance for landscape management.

Wool – a notable product of transhumance in the past – receives currently not the same appreciation as milk and meat products. Practitioners can be obliged to pay for its disposal instead of getting an income from the sales. Welcoming visitors, offering and selling products and experiences, sometimes combined with educational purposes, have developed into additional purposes of transhumance for some practitioners.

3.3 Challenges

As shown in the previous sections, a large diversity of transhumance practices exists. Thus, challenges met by transhumance practitioners in their daily life may vary. For example, flocks moving on foot over large distances are more prone to accidents, may experience more challenges with road traffic and need access to more pastures than flocks moved by vehicles in one day (Figure 12). However, several challenges occur across different types of practices and countries.

Access to workforce is such a common challenge. Aging herders are not or to a limited degree replaced. Even if workforce is available, potential herders may lack experience and training. A dearth of new generations interested in taking over a farm and practicing transhumance reduces the number of practitioners, as well. Missing understanding of agriculture production and transhumance by the public and sometimes landowners is a similar societal challenge. This absence can be the reason why transhumance practitioners can face prejudice and lacking appreciation of their work in some countries. Another challenge for transhumance practitioners is changes in consumer preferences such as a drop in meat consumption. While pastures in high-lying areas are quite easily available in, for example, Italy and Norway, competition with other land uses is an important issue especially in lowland areas of countries such as France, Spain, and Italy. Development of industries, urban areas, and infrastructure restricts access to winter pastures and makes it difficult for herders to follow their traditional routes.



ALEXANDRA KRUSE

Figure 11: Grazing for land management purposes in Germany.

Transhumance practitioners receive subsidies in line with other agricultural practitioners and targeted funding in some countries (France, Germany, Italy, Norway). Eligibility criteria and that they may change can exclude practitioners from support and may cause uncertainty. At the same time the effort to apply for subsidies and the changing regulations can result in practitioners refraining from applying.

In addition to the societal and political framework and changes therein, environmental changes may cause challenges for transhumance practitioners. Especially in France, Italy and Slovakia, a growing wolf population is an important and increasing challenge. Measures taken to hinder predation such as enclosures for the night and guard dogs may result in changes in grazing patterns and cause tensions when tourists feel threatened by the dogs. The quality and productivity of pastures is another important environmental issue. Lacking obligation to manage pastures may reduce pasture quality. Climate change including extreme weather events such as periods of droughts are challenging future prospects. Finally, to take care of transhumance' cultural heritage values, it needs to be practiced. Thus, the declining number of practitioners is not only a challenge for maintaining tangible heritage, such as tools and buildings. It challenges especially the preservation of intangible heritage including songs, dances and localized knowledge about pasture management and food production.

4 Discussion

The results show that transhumance covers a broad range of practices that even have become more diversified in the recent past. Despite adaptations to make use of new business opportunities and financial support for practitioners the overall trend has been as in other countries a continuing decline in transhumance (Collis 2016). Challenges linked to societal, cultural, environmental, and politically enacted structural changes presented in our results have been reported for many years and European countries (Herzog et al. 2005; Liechti and Biber 2016). Thus, despite efforts to increase awareness about transhumance still a 'major effort' (Bunger and Haarsaker 2020) including economic support not only in Norway but the whole of Europe



MARIANNA FABBRIZIOLI

Figure 12: A herd crossing a road near Padova.

is needed to maintain and develop transhumance. The following discussion focuses on those needs of and opportunities for transhumance practitioners that are linked to the use of commons.

4.1 Access to land needs to be secured

In line with reports of under-use of grazing areas in commons (Brown 2006; Brossette, Bieling and Penker 2022), our results indicate that in general access to grazing in mountain areas is not a challenge. Historical records document that access to land and grazing rights has been subject to conflicts, as examples from Germany and Norway show (Potthoff 2007; Heimat- und Geschichtsverein Glauberg e.V. 2021). The location of commons in areas currently considered marginal in terms of agricultural production (Brown 2005; Brown 2006) is a likely reason for reduced competition for grazing resources. However, to secure access to land also in mountain areas is important. Changing regulations for access to commons managed by agrarian communities in Slovenian mountains resulting in a declining use of pastures is an important reminder of this (Potthoff et al. 2020).

Our results show that making use of transhumance landscapes for recreational purposes raises other issues of access to land than for grazing resources. The tensions between guard dogs and hikers are an example of conflicts that may arise when different groups want to make use of the same landscape. Similar conflicts between use of mountain areas for agricultural and tourism purposes have been reported, for instance, for the Bavarian Alps (Mayer and Job 2010).

The many examples of opportunities for transhumance practitioners to gain an additional income from tourism (see Introduction) are a reminder that striking a balance between different land uses is necessary and that access to land and grazing resources need to be given a strong weight (Potthoff et al. 2020; Bindi 2022a). The challenges regarding climate change including periods of droughts underline that transhumance practitioners will need a – probably increasing – flexibility in choice of pastures to secure appropriate grazing resources throughout the whole year.

Commons can play an important role in securing this flexibility. They are often administered through more or less formalized local management bodies (Berge 2006; Brown 2006; Brossette, Bieling and Penker 2022; Hartmann, Bán and Barta 2022). Through their local ecological knowledge these administrative bodies would probably be well equipped to understand and respond to transhumance practitioners needs for flexible access to pastures.

4.2 Land management as an opportunity

The under-use of grazing recourses in commons and land abandonment in general, regrowth of vegetation and loss of biodiversity has opened up new opportunities for transhumance practitioners (Bunce et al. 2004; Brown 2006; Tasser et al. 2007; Filho et al. 2017; Bryn and Potthoff 2018; Gabrovec and Kumer 2019; Brossette, Bieling and Penker 2022). As our results show, landscape management for biodiversity reasons is a rather recent purpose. To maintain landscapes for environmental purposes is a practice also carried out in other types of grazing landscapes than transhumance landscapes (Török et al. 2016).

Currently it seems unlikely that trends of abandonment of marginal agricultural land – such as in mountain areas – will be reversed (Lasanta et al. 2017). Transhumance has been declining for a long time despite efforts to reverse this trend (Herzog et al. 2005; Liechti and Biber 2016). Thus, increasing the support for the management efforts transhumance practitioners undertake will not only provide an (extra) income for practitioners but also maintain landscape qualities. Transhumance with landscape management as its sole purpose will most likely be needed to maintain the current use of pastures or even increase it.

The need to maintain pastures through landscape management underlines that pastures have lost economic value for agricultural production. The example of the dry summer in 2018 in Norway showed how agricultural resources commonly considered marginal such as mountain pastures can become important in times of crises (Beitnes, Kopainsky and Potthoff 2022). They provided grazing resources when fodder in the lowlands became sparse (Beitnes, Kopainsky and Potthoff 2022). Grazing is needed not only to keep landscapes open but also to maintain or improve productivity of re-grown grazing land (Blaschka et al. 2014). Thus, maintaining grazing resources for potential extreme weather events is an important contribution to climate change adaptation.

We would like to underline that movement of livestock to and among pastures without the constant presence of people is practiced and important for landscape management purposes. New technology can be used to keep livestock grazing in defined areas without the need to set up fences. However, such a kind of management is not an option in areas where livestock grazing is challenged by predators (Bruns, Waltert and Khorozyan 2020).

4.3 Urban transhumance as a way of bringing transhumance to people

Commons are commonly considered a rural phenomenon (Gidwani and Baviskar 2011; Kronberger and Borch 2015). However, it has been highlighted that commons, including wetlands, landfills, public spaces, and sidewalks, occur in urban areas, as well (Gidwani and Baviskar 2011). Although urban commons may have distinct characteristics and values – ‘[i]n the city, the commons is an inherently relational phenomenon’ (Kronberger and Borch 2015, 7) – specific urban spaces, such as public parks provide grazing resources.

Although, urban green spaces cannot compensate for loss of lowland pastures, they at least provide access to some grazing resources in densely populated area. Urban transhumance brings transhumance into urban areas where, based on the Urban population data provided by World Bank, a large share of the European population is living. Urban transhumance could even be a possibility to revive transhumance in the Netherlands or Belgium. In that way urban commons provide important opportunities for awareness rising about agriculture and transhumance. Urban transhumance could help to increase understanding of transhumance as a way of producing food, re-establishing a link between users and producers. Providing knowledge about transhumance can increase appreciation by society and raise understanding of, for example, the quality and higher prices of transhumance products. In France, the government financially supports urban transhumance that provides contact with animals, especially sheep and goats, due to its approved therapeutic effect (Nicourt and Cabaret 2019).

5 Conclusions

Commons, in various forms, play a central role for transhumance as they provide crucial grazing resources. The broad range of different ways to carry out transhumance and new purposes of transhumance show that practitioners have found ways to carry out transhumance in the 21st century. However, previous efforts to help transhumance practitioners tackle the challenges they meet need to be reinforced. In terms of policy, this means to support improving the economic situation, awareness raising among the general public and educational opportunities for transhumance practitioners. Currently, transhumance practitioners within all types of transhumance may need training of special skills. Communicative skills are, for example, important for practitioners who welcome visitors or meet people who use the landscape for recreational purposes. We assume that especially urban transhumance practitioners need communicative skills since they are in contact with a large number of citizens and especially children during their work.

Commons play an important role in providing access to grazing resources in rural and – although to a more limited degree – in urban areas. Access to this land needs to be secured. In addition, urban commons provide a huge potential for awareness raising about agriculture and land- and resource management. Grazing of commons ensures maintaining their productivity and is an important investment in terms of future climate change.

6 References

- Beitnes, S. S., Kopainsky, B., Potthoff, K. 2022: Climate change adaptation processes seen through a resilience lens: Norwegian farmers' handling of the dry summer of 2018. *Environmental Science & Policy* 133. DOI: <https://doi.org/10.1016/j.envsci.2022.03.019>
- Bele, B., Nielsen, V. K. S., Orejas, A., Ron, J. A. 2021: Intangible cultural heritage of transhumance landscapes: their roles and values – examples from Norway, France and Spain. *Transhumance. Papers from the International Association of Landscape Archaeology Conference, Newcastle upon Tyne, 2018*. Oxford.

- Belliggiano, A., Bindi, L., Ievoli, C. 2021: Walking along the Sheeptrack ... Rural Tourism, Ecomuseums, and Bio-Cultural Heritage. Sustainability 13-16. DOI: <https://doi.org/10.3390/su13168870>
- Berge, E. 2006: Protected areas and traditional commons: values and institutions. Norsk Geografisk Tidsskrift–Norwegian Journal of Geography 60-1. DOI: <https://doi.org/10.1080/00291950600548907>
- Bindi, L. (ed.) 2022a: Grazing Communities. Pastoralism on the Move and Biocultural Heritage Frictions. New York, Oxford. DOI: <https://doi.org/10.3167/9781800734753>
- Bindi, L. 2022b: Introduction. Grazing Communities. Pastoralism on the Move and Biocultural Heritage Frictions. New York, Oxford.
- Blaschka, A., Ringdorfer, F., Huber, R., Guggenberger, T., Haslgrübler, P. 2014: Almre kultivierung durch gezielte Beweidung mit Schafen – Ergebnisse aus dem Almlammprojekt Hauser-Kaibling. 8. Fachtagung für Schafhaltung. Irdning-Donnersbachtal.
- Bowden, M., Herring, P. 2021: Introduction: the recognition of transhumance in Britain. Transhumance. Papers from the International Association of Landscape Archaeology Conference, Newcastle upon Tyne, 2018. Oxford.
- Brossette, F., Bieling, C., Penker, M. 2022: Adapting common resource management to under-use contexts: The case of common pasture organizations in the Black Forest Biosphere Reserve. International Journal of the Commons 16-1. DOI: <https://doi.org/https://doi.org/10.5334/ijc.1138>
- Brown, K. M. 2005: Contemporary rural change and the enactment of common property rights: the case of crofting common grazings. Ph.D. thesis, University of Aberdeen. Aberdeen.
- Brown, K. M. 2006: New challenges for old commons: The role of historical common land in contemporary rural spaces. Scottish Geographical Journal 122-2. DOI: <https://doi.org/https://doi.org/10.1080/00369220600917412>
- Bruns, A., Waltert, M., Khorozyan, I. 2020: The effectiveness of livestock protection measures against wolves (*Canis lupus*) and implication for their co-existence with humans. Global Ecology and Conservation 21. DOI: <https://doi.org/10.1016/j.gecco.2019.e00868>
- Bryn, A., Potthoff, K. 2018: Elevational treeline and forest line dynamics in Norwegian mountain areas – a review. Landscape Ecology 33-8. DOI: <https://doi.org/10.1007/s10980-018-0670-8>
- Bunce, R. G. H., Pérez-Soba, M., Jongman, R. H. G., Gómez Sal, A., Herzog, F., Austad, I. (eds.) 2004: Transhumance and Biodiversity in European Mountains. Report of the EU-FP 5 project TRANSHUMOUNT (EVK2-CT-2002-80017). Wageningen.
- Bunger, A. A., Haarsaker, V. 2020: Færre og større melkebruk – hva skjer med seterdrifta? AgriAnalyse AS. Oslo.
- Centuri, C. 2022: National Report – Hungary. Report, EUCALAND. Overath.
- Collis, J. R. 2016: Summer farms: An introduction. Summer Farms: Seasonal Exploitation of the Uplands from Prehistory to the Present. Sheffield.
- Collis, J. R., Pearce, M., Nicolis, F. (eds.) 2016: Summer Farms: Seasonal Exploitation of the Uplands from Prehistory to the Present. Sheffield.
- Colombino, A., Powers, J. J. 2022: Revisiting transhumance from Stilfs, South Tyrol, Italy. Grazing Communities. Pastoralism on the Move and Biocultural Heritage Frictions. New York, Oxford.
- Davies, E. 1941: The patterns of transhumance in Europe. Geography 26-4.
- De Vooy, A. C. 1959: Uitholling van geografische begrippen: de transhumance. Geografisch Tijdschrift 12.
- Dreer, J., Kruse, A. 2023: National Report – Germany. Report, Hof und Leben, EUCALAND. Kirchdorf.
- Duclos, J. C., Fabre, P. 2022: Between two different worlds. Pastoralism and protected natural areas in Provence-Alpes-Côte d'Azur. Grazing Communities. Pastoralism on the Move and Biocultural Heritage Frictions. New York, Oxford.
- Ferrario, V., Rossi, L., Fabbriozoli, M. 2023: National Report – Italy. Report, EUCALAND. Overath.
- Filak, M., Gorišek, Ž. 2022: The coexistence of transhumance shepherding practices and tourism on Bjelašnica Mountain in Bosnia and Herzegovina. Grazing Communities. Pastoralism on the Move and Biocultural Heritage Frictions. New York, Oxford.
- Filho, W. L., Mandel, M., Al-Amin, A. Q., Feher, A., Jabbour, C. J. C. 2017: An assessment of the causes and consequences of agricultural land abandonment in Europe. International Journal of Sustainable Development & World Ecology 24-6. DOI: <https://doi.org/10.1080/13504509.2016.1240113>
- Gabrovec, M., Kumer, P. 2019: Land use changes in Slovenia from the Franciscan cadaster until today. Acta geographica Slovenica 59-1. DOI: <https://doi.org/https://doi.org/10.3986/AGS.4892>

- Gardiner, M. 2018: The changing character of transhumance in early and later medieval England. *Historical Archaeologies of Transhumance across Europe*. London, New York.
- Gidwani, V., Baviskar, A. 2011: Urban commons. *Economic & Political WEEKLY* 4650.
- Hartmann, J., Bán, M., Barta, Z. 2022: Coping with dismantling forces: Traditional Management and Transformations of Székely-Hungarian village commons of Transylvania in the 16–21th centuries. *International Journal of the Commons* 16-1. DOI: <https://doi.org/https://doi.org/10.5334/ijc.1187>
- Heimat- und Geschichtsverein Glauberg e.V. 2021. Von ungehorsamen Glaubergern und halsstarrigen Stockheimern. Die Geschichte hinter dem Abriss des Glaubergs von 1580. Glauberg. Internet: <https://www.heimat-und-geschichtsverein-glauburg.de/> (04.07.2022).
- Herzog, F., Bunce, R. G. H., Pérez-Soba, M., Jongman, R. H. G., Sal, A. G., Austad, I. 2005: Policy options to support transhumance and biodiversity in European mountains. A report on the TRANSHUMOUNT Stakeholder Workshop, Landquart/Zurich, Switzerland, 26–28 May 2004. *Mountain Research and Development* 25-1. DOI: [https://doi.org/10.1659/0276-4741\(2005\)025\[0082:POTSTA\]2.0.CO;2](https://doi.org/10.1659/0276-4741(2005)025[0082:POTSTA]2.0.CO;2)
- Karatassiou, M., Parissi, Z., Chouvardas, D., Athanasiadou, E. 2022: National Report – Greece. Report, Aristotle University of Thessaloniki. Thessaloniki.
- Kronberger, M., Borch, C. 2015: Introduction. *Urban commons. Urban Commons. Rethinking the City*. Oxon, New York.
- Kruse, A., Centeri, C., Renes, H., Roth, M., A., P., Palang, H., Benito Jordá, L., Velarde, M. D., Kruckenberg, H. 2010: Glossary on Agricultural Landscapes. *Journal of Landscape Ecology (Hungary) Special Issue*.
- Lasanta, T., Arnáez, J., Pascual, N., Ruiz-Flaño, P., Errea, M. P., Lana-Renault, N. 2017: Space-time process and drivers of land abandonment in Europe. *Catena* 149-3. DOI: <https://doi.org/10.1016/j.catena.2016.02.024>
- Liechti, K., Biber, J. P. 2016: Pastoralism in Europe: characteristics and challenges of highland–lowland transhumance. *Revue Scientifique et Technique-Office International des Epizooties* 35-2. DOI: <https://doi.org/10.20506/rst.35.2.2541>
- Mannia, S. 2022: Wandering shepherds. New and old transhumances in Sardinia and Sicily. *Grazing Communities. Pastoralism on the Move and Biocultural Heritage Frictions*. New York, Oxford.
- Mastronardi, L., Giannelli, A., Romagnoli, L. 2021: Detecting the land use of ancient transhumance routes (*Tratturi*) and their potential for Italian inner areas' growth. *Land Use Policy* 109. DOI: <https://doi.org/10.1016/j.landusepol.2021.105695>
- Mayer, M., Job, H. 2010: Raumrelevante Konflikte zwischen Almwirtschaft, Naturschutz und Tourismus. Ergebnisse einer Befragung in den oberbayerischen Alpen. *Naturschutz und Landschaft* 42-2.
- Mientjes, A. C. 2008: Paesaggi pastorali. Studio etnoarcheologico sul pastoralismo in Sardegna. Calgliari.
- Nicourt, C., Cabaret, J. 2019. Quelle multifonctionnalité des transhumance urbaines de brebis? *Vertigo* 19-1. DOI: <https://doi.org/10.4000/vertigo.24819>
- Olsson, E. G. A., Austrheim, G., Grenne, S. N. 2000: Landscape change patterns in mountains, land use and environmental diversity, Mid-Norway 1960-1993. *Landscape Ecology* 15. DOI: <https://doi.org/10.1023/A:1008173628016>
- Oteros-Rozas, E., Ontillera-Sánchez, R., Sanosa, P., Gómez-Baggethun, E., Reyes-García, V., González, J. A. 2013. Traditional ecological knowledge among transhumant pastoralists in Mediterranean Spain. *Ecology & Society* 18-3. DOI: <https://doi.org/10.5751/ES-05597-180333>
- Potthoff, K. 2007: Glimt fra stølshistorien. Vennlige Vestlandsfjell – Stølsheimen, Vossefjellene og Vikafjellet. Oslo.
- Potthoff, K. 2022: National Report – Norway. Report, Norwegian University of Life Sciences. Ås.
- Potthoff, K., Fox, M., Kruse, A. 2023: Summary Report. Report, TRANSFARM consortium.
- Potthoff, K., Smrekar, A., Šmid Hribar, M., Urbanc, M. 2020: The past and perspective development of pasturing and tourism in the mountains: Insights from Norway and Slovenia. *Geografski vestnik* 92-1. DOI: <https://doi.org/10.3986/GV92105>
- Reinton, L. 1955: Sæterbruket i Noreg I. Sætertypar og driftsformer. Oslo.
- Reinton, L. 1957: Sæterbruket i Noreg II. Anna arbeid på sætra. Sætra i haustingsbruket og i matnøysla ellers. Oslo.
- Reinton, L. 1961: Sæterbruket i Noreg III. Oslo.
- Renes, H. 2022: National Report – Low Countries. Report, EUCALAND. Overath.
- Roc, J. C. 1992: Burons de Haute Auvergne, architecture et environnement. Sept siècles d'histoire. Brioude.
- Sanchez, P.R. 2022: National Report – Spain. Report, OnProjects. Granada.

- Sevatdal, H., Grimstad, S. 2003: Norwegian Commons: history, status and challenges. Commons: Old and New. Trondheim.
- Sickel, H., Abrahamsen, R. K., Eldegard, K., Lunnan, T., Norderhaug, A., Petersen, M. A., Sickel, M. et al. 2014: Dairy cattle on Norwegian alpine rangelands – grazing preferences and milk quality. Forage resources and ecosystem services provided by Mountain and Mediterranean grasslands and rangelands. Zaragoza.
- Slámová, M., Mikušová, M., Belčáková, I., Schwarz, M., Slobodník, B., Rácz, A. 2022: National Report – Slovakia. Report, Technical University in Zvolen. Zvolen.
- Sørensen, M. V., Strimbeck, R., Nystuen, K. O., Kapas, R. E., Enquist, B. J., Graae, B. J. 2018: Draining the pool? Carbon storage and fluxes in three alpine plant communities. *Ecosystems* 21. DOI: <https://doi.org/10.1007/s10021-017-0158-4>
- Šmid Hribar, M., Hori, K., Urbanc, M., Saito, O., Zorn, M. 2023. Evolution and new potentials of landscape commons: Insights from Japan and Slovenia. *Ecosystem Services* 59. DOI: <https://doi.org/10.1016/j.ecoser.2022.101499>
- Tasser, E., Walde, J., Tappeiner, U., Teutsch, A., Noggler, W. 2007: Land-use changes and natural reforestation in the Eastern Central Alps. *Agriculture, Ecosystems and Environment* 118-1–4. DOI: <https://doi.org/10.1016/j.agee.2006.05.004>
- Török, P., Hölzel, N., van Diggelen, R., Tischew, S. 2016: Grazing in European open landscapes: How to reconcile sustainable land management and biodiversity conservation. *Agriculture, Ecosystems & Environment* 234. DOI: <https://doi.org/10.1016/j.agee.2016.06.012>
- Toulze, P. F. 2022: National Report – France. Report, EUCALAND, Overath.
- TRANSFARM. 2022. Glossary. Internet: <https://transfarm-erasmus.eu/resources> (08.09.2022).
- UNESCO. 2019. Transhumance, the seasonal droving of livestock along migratory routes in the Mediterranean and in the Alps. Internet: <https://ich.unesco.org/en/RL/transhumance-the-seasonal-droving-of-livestock-along-migratory-routes-in-the-mediterranean-and-in-the-alps-01470> (12.09.2022).

TOWARDS THE EFFICIENT RESPONSE OF FOREST OWNERS TO LARGE-SCALE FOREST DAMAGE: AN EXAMPLE OF FOREST COMMONS

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A large scale ice-break hit Postojna region in February 2014.

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Towards the efficient response of forest owners to large-scale forest damage: An example of forest commons

ABSTRACT: This article aims to analyse the response of private forest owners to a series of extreme environmental disturbances in the Slovenian karst region in the period 2014–2016. Quantitative and qualitative analysis of empirical forest management data on response time and harvesting time, as well as interpretations of response drivers, led to the identification of forest commons as a fast and efficient type of forest ownership, despite almost a century of state suppression of their local institutions. Among the internal and external response drivers, a norm of responsibility and forest management competence were highlighted. Our study highlights the potential of forest commons for active forest management in Europe. A concerted response from private and state institutions should not only take into account economies of scale, but also traditional knowledge and local social norms.

KEY WORDS: harvesting behaviour, natural disturbances, forest management, Slovenia

Za učinkovit odziv lastnikov gozda na veliko površinske poškodbe gozda: primer agrarnih skupnosti

POVZETEK: Preučili smo odziv zasebnih lastnikov gozda na zaporedje ekstremnih okoljskih motenj gozda v kraški pokrajini v Sloveniji v obdobju 2014–2016. Kvantitativna in kvalitativna analiza empiričnih podatkov o hitrosti odziva na poškodbe gozda in o trajanju sečnje ter vpogled v razlage domačinov omogočajo interpretacijo agrarnih skupnosti kot učinkovite oblike lastništva gozda, kljub skoraj stoletnemu državnemu omejevanju njihovega delovanja. Razlogi za to so različni, med notranjimi pa sta tudi norma odgovornosti in kompetence gospodarjenja z gozdom. Študija osvetljuje potencial agrarnih skupnosti za aktivno gospodarjenje z gozdom v Evropi. Usklajen odziv zasebnih in državnih institucij naj ne bi upošteval le ekonomije velikosti, ampak tudi tradicionalno znanje in lokalne družbene norme.

KLJUČNE BESEDE: sanitarna sečnja, naravne motnje, gospodarjenje z gozdom, Slovenija

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1 Introduction

The increasing frequency and severity of environmental challenges underscores the need for a collective response (Bodin 2017). Ecosystems on limestone bedrock are particularly vulnerable to disturbances (Vilhar et al. 2022). Climate induced large-scale forest disturbances have been reported from nearby Austria (The Orientgate... 2014) to distant China where a monsoon climate and human activities are threatening a fragile soil layer to the point of desertification (Xiao et al. 2020). The negative impacts of large-scale forest disturbances on karst hydrology have been thoroughly analysed by Vilhar et al. (2022), who found that ice storms in Europe often affect the Dinaric Alps. Slovenia experiences several types of weather-related stress such as drought, wind, storms and ice-breaks, resulting in numerous studies on forest disturbances, including those caused by ice storms (Sinjur et al. 2014; Saje 2014; de Groot, Ogris and Kobler 2018; Mori and Poljanec 2019; Kutnar, Kermavnar and Pintar 2021; Unay-Gailhard and Bojnec 2021). Weather-related forest disturbance occurs regularly but on a relatively small scale. In 2014, a large-scale ice-break and the subsequent bark beetle outbreak in 2016 stimulated the response of both professional state forest institutions and local forest owners. The infrequent consideration of the social perspective of these events as well as the inadequate recognition of common-pool resources as public goods motivated our research (Šmid Hribar et al. 2018).

We focused on the Inner Karst region of Slovenia. We examined the post-disturbance forest management interventions of organized local forest owners, known as forest commons (hereinafter FC). They are a local tradition of collective action that has not been evaluated thus far from the perspective of addressing uncertainty in forest management. We aimed to fill the knowledge gap in the provision of an efficient response to large-scale forest disturbances. This represents a particular knowledge gap, as there is no international literature on the response of FC to natural disturbances, and FC in Slovenia have only recently gained legal recognition (Premrl et al. 2015; see also Agricultural communities Act published in the Official Gazette of the Republic of Slovenia, 2015). The FC is the best known form of collective action, but there are also other types of commons (Šmid Hribar, Urbanc and Zorn 2023). Activities of FC generally refer to group functioning and property maintenance (infrastructure maintenance and construction, harvesting, initiatives to decision-makers, local investments (Bavec et al. 2021). On average, this age-old form of social organization can still be flexible and responsive (Andersson, Keskitalo and Bergstén 2018).

This study aims to determine whether FC responded to the ice-break and the bark beetle outbreak in 2016 more quickly in comparison to other types of forest owners. The hypothesis is that the response of FC was faster than that of other types of private forest owners. The objectives of the article were 1) to fill the gap in the empirical examination of private forest owner behaviour, 2) to compare the response of FC and other types of private forest owners to forest disturbance and 3) to provide a basis for strengthening the active response to large-scale forest disturbance. According to the Agricultural Communities Act (2015), Slovenian FC are formally recognized agrarian communities. They are groups of people who jointly own and manage their properties. These groups predominantly consist of local inhabitants with established relationships with each other and with the territory. Their relational character is crucial and was well described by Harvey in 2012 (cited in Casas-Cortes, Cobarrubias and Pickles 2014, 450) as »a form of relation as well as production based on social cooperation«. Their collaborative activity, joint action and particular governance model in Slovenia has already been presented (Bogataj and Krč 2014; Premrl et al. 2015; Šmid Hribar et al. 2018; Bavec et al. 2021), as well as related to other European practices (De Moor 2015; Lawrence et al. 2020; Haller et al. 2021). In addition to their specific governance model, the essential element of FC are social norms. Post-disturbance interventions might account for this (Deuffic, Arts and Sotirov 2018; Holt et al. 2021). This is particularly important in collaborative governance arrangements, as their joint problem identification (e.g. forest management) and negotiated solutions have been found to be effective for socio-environmental sustainability (Bodin 2017; Tucker et al. 2023).

1.1 Theoretical background

Private forest owners have the legal right to »freely and exclusively use, control, transfer or otherwise benefit from forest« (Food and ... 2018, 16). Their management behaviour balances short-term individual and long-term shared collective benefits and aims. However, in addition to individual and community needs, institutional regulations and actions impact their management behaviour (Deuffic, Arts and Sotirov 2018;

Lawrence et al. 2020), as forest ownership is defined as »a system of interrelated but distinct features which includes institutional setting, the allocation of property rights, the nature of ownership, the character of the owning entity and the regulation(s) and organization of the forest management« (Weiss and Nichiforel 2020, 19). Regulatory instruments and organization in former communist countries, including Slovenia, are rooted in a restrictive approach (Nichiforel et al. 2020), including the suppression of community institutions (Premrl et al. 2015; Lidestav et al. 2017; Weiss et al. 2017; Wong, Posavec and Bogataj 2019; Lawrence et al. 2020). Therefore, it is not surprising that the active engagement of forest owners in forest management and their actual behaviour in response to environmental challenges remain gaps in our understanding. While examples of responses to forest-related storms (Hartebrodt 2004; Marzano, Blennow and Quine 2013; Magomedova 2015; Lidskog and Sjödin 2016), community forest management related to the socio-ecological context (Pagdee, Kim and Daugherty 2006) and extreme natural events (Qin et al. 2017) exist, Slovenian studies mostly focus on structuring private forest owners according to particular indicators, such as motives, wood production and gender (Table 1).

The large and heterogeneous population of private forest owners in Europe live in very diverse contexts. Their management behaviour is poorly understood due to the absence of contextualized empirical information (Canadas and Novais 2014; Weiss et al. 2017; Ficko et al. 2019; Kumer and Pezdevšek Malovrh 2019; Stare, Grošelj and Pezdevšek Malovrh 2020). For example, the tradition of joint forest management has no statistical background at the national or international level (Lidestav et al. 2017; Lawrence et al. 2020). The tradition of local institutions representing socio-ecological systems links dynamic ecosystems with adaptive management practices (Bodin 2017; Colding and Bartel 2019). The importance of practice is therefore well founded and should complement reductionist »command and control« approaches to forest management (Lawrence 2017). Furthermore, the effective combination of local and state governance approaches may improve forest management under climate change (Seidl et al. 2017), where routine responses are rarely possible. We have assumed that an extreme environmental disturbance precludes a routine response, and this is how the PIAAC study (PIAAC ... 2009) defines problem solving. The intentional study of documented forest owner post-disturbance behaviour is therefore an advantage of our study as it sheds light on how FC solved a problem of forest disturbance after an ice-break. While examples from Germany (Hartebrodt 2004; Ewers 2010) and Sweden (Lidskog and Sjödin 2016; Eriksson 2017) exist, there is a lack of research in the karst areas we examined. Forest management decision-making (Veselič et al. 2015; Ficko 2019) required a rapid response and the involvement of local and state stakeholders.

The state forest management method in Slovenia, called the control method (Gašperšič 2008), requires informational loops that periodically adjust forest management measures to the specific field situation during ten-year forest management plans. These informational loops enable learning. However, learning loops are also present among local forest owners whose learning loops are not prescribed, regular or formal, but rather experiential and unpredictable. The ability to learn and implement concerted action is crucial. European studies of response to forest disturbance, such as the Swedish Gudrun windstorm (Lidskog and Sjödin 2016)

Table 1: The dominant perspectives of Slovenian private ownership studies.

Dominant perspective	Topic of analysis	Source
Production	Property size & fragmentation, Typology, Associative potentials, Conceptualization of Forest Management	Medved 2003; Krč et al. 2008; Ficko and Bončina 2013; Pezdevšek Malovrh et al. 2015; Češarek, Ficko and Bončina 2018; de Groot, Ogris and Kobler 2018; Ficko 2019
	Harvesting, Management, Adaptive management	Poje, Pezdevšek Malovrh and Krč 2016; Ficko et al. 2019; Ficko and Bončina 2019; Mori and Poljanec 2019; Stare, Grošelj and Pezdevšek Malovrh 2020; Stare, Grošelj and Pezdevšek Malovrh 2022
Social structures and empowerment	Female representation	Bogataj 2010; Krajnc et al. 2021;
	Local knowledge transfer	Čoderl, Jamnik and Bogataj 2012
	Collective forest management	Bogataj and Krč 2014; Gatto and Bogataj 2015; Bavec et al. 2021

and wildfires in Catalonia, Spain (Rodríguez-Carreras and Úbeda 2020), are theoretically based on communities of practice (Wenger 2000), as this approach considers the social drivers of complex behaviour and situational reflexive learning, which is practiced through socialization and the evolution of social norms. These are regarded as a system-wide factor in environmental governance (Bodin 2017). It is assumed that recurring ice-breaks in the past enabled the accumulation of forest management competence and effective problem solving, as people learn and adapt through practice (Lawrence 2017). A complex individual cognitive process of simultaneous thinking and action takes place when goals cannot be achieved routinely (PIAAC ... 2009; Janssen 2015), which is closely linked to the formation of ties in collaborative networks (Bodin 2017) and spatial clusters (Mantilla 2018).

2 Study area and methods

2.1 Study area

The study area was the Postojna regional forest district of the Slovenia Forest Service (hereinafter SFS) (Figure 1). It is located in the so-called Inner Karst, also called the Green Karst for its typical forest cover. Around 50,000 inhabitants are dispersed across 261 settlements and the town of Postojna, which is home to approximately one-third of the population of the Inner Karst (Zavod za gozdove ... 2011). The economy of the Postojna area is based on industry and services, such as tourism. Residents also commute daily to nearby towns. Forests cover 74% of the area, which is above the Slovenian average (60%) and is still increasing, e.g. by 21% in the last four decades (Zavod za gozdove ... 2011). Forests currently cover 79,640 hectares. This typical rural area of pre-alpine Dinaric forests serves multiple functions and provides a variety of ecosystem services, hydrology and biodiversity being the most important, but wood production is also important as the forests are highly productive. Beech and mixed forests dominate, and only 24% of forests are protective forests. The average annual amount of salvage logging in this area between 1995 and 2012 was 72,000 m³, representing 3% of the annual Slovenian harvest and 7% of the total sanitary logging in Slovenia (Saje 2014; Sinjur et al. 2014).

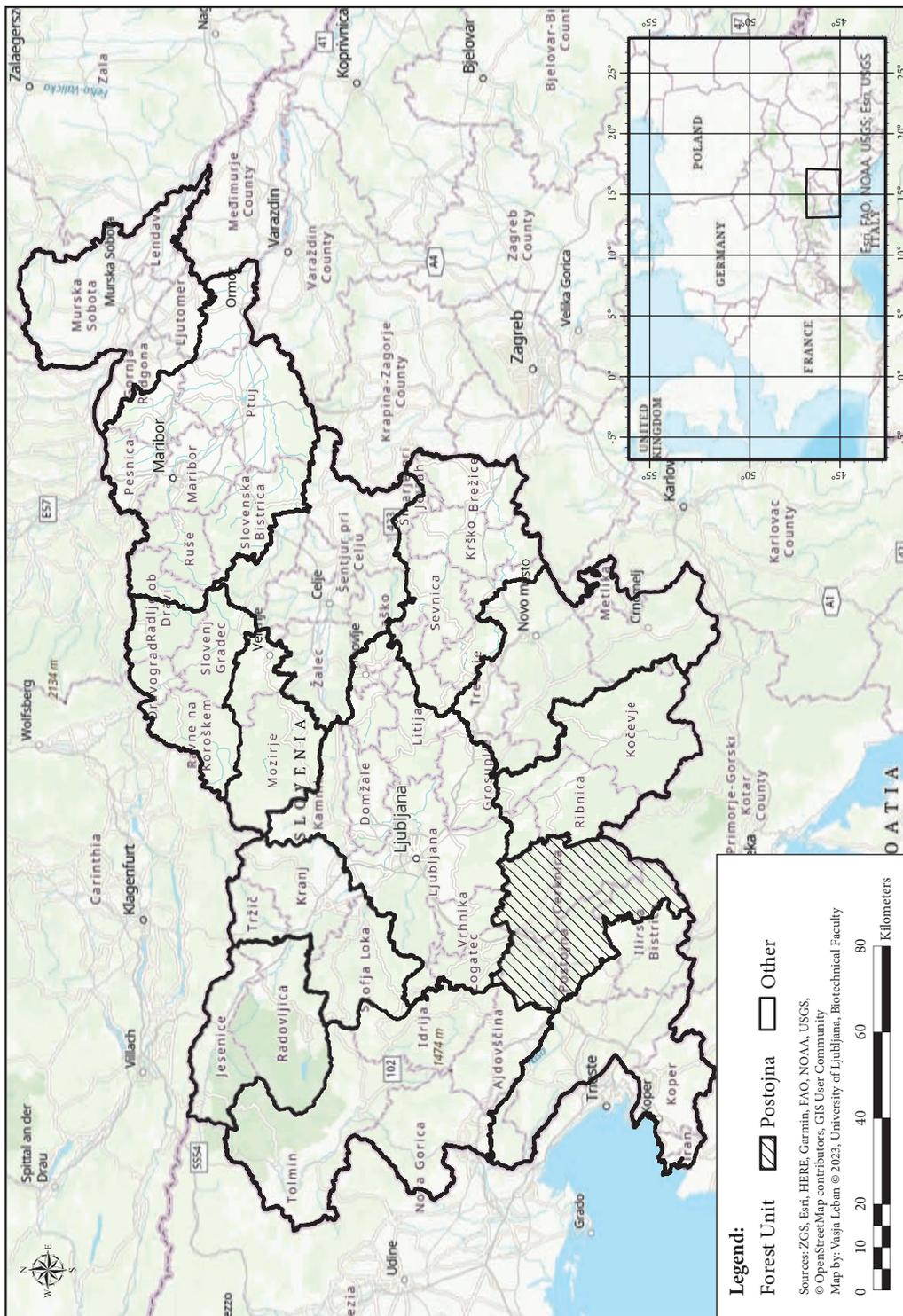
The Postojna forest district was severely affected by a natural ice-break between 30 January and 10 February 2014, which damaged all Slovenian forests. At the national level, this event resulted in more than the entire average annual logging, a rapid increase in salvage costs and negative implications in the medium and long term (Unay-Gailhard and Bojnec 2021). In the area of observation, the ice-break affected the area between 500 and 999 m a.s.l. where planted spruce dominates. Outside of this belt, less than 1% of the timber was harvested. The result was approximately 943,400 m³ of damaged wood. Sudden amounts of wood may have been a market opportunity, but the role of the market was outside the scope of this analysis, as the wood was mobilized due to natural factors and not intentionally. Insect outbreaks followed in the spring of 2016, followed by a windstorm in 2017 that caused further disturbance on steeper slopes (de Groot, Ogris in Kobler 2018). The direct salvage costs have never been calculated. Due to a lack of local and national technical capacities, facilities from Austrian Alpine forest districts were called in. The regional SFS authorities prioritized larger parcels of woodland regardless of the type of forest owner.

2.2 Methods

The study uses a mixed methods approach, combining quantitative and qualitative analysis. A description of the analytical approach is provided below together with a description of the data source and variables.

The quantitative component focuses on the following response indicators:

- Response time defined as the difference between the date of realization of the legislative order and the date of its uptake; minimum response time refers to the first legislative order, average response time refers to the average for all legislative orders, and maximum response time refers to the last legislative order.
- Harvesting time, defined as the average time difference between the realization of the last and the first legislative order.



- Realization of legislative orders, defined as the average time difference between the conclusion of harvest and the deadline prescribed in legislative orders.

The forest related data used in this study are derived from the forest management plan for the period 2012–2022 (Zavod za gozdove ... 2011) documented in the official database of the SFS. Variables analysed were site and forest stand characteristics and transport distances indicating accessibility. Harvests affected by the ice-break in 2014 and by bark beetles in 2016 in privately owned forests and the forest owner data were obtained from obligatory directives for sanitary and salvage forest operations, entitled »legislative orders« which specify the volumes and deadlines of harvests and silvicultural/protective measures for sanitary and salvage logging. The source of these data were the SFS database for 2014 and 2016. State-owned forests were excluded from the analysis. The ice-break did not affect all FC in the area.

The deadlines for the conclusion of harvesting after the ice-break (considered primary forest disturbance) were set for up to two years after the event, while those for the bark beetle outbreak (considered secondary disturbance) were adapted to local situations. The forest-related data (forest area (sum of parcels), amount of wood harvested for conifers/broadleaves) were linked with salvage logging in the following way: first, we linked these data with owners and evaluated harvests according to types of ownership, and then

Table 2: Description of the qualitative data collection.

Phase of work	Participants	Place, Time, No. of participants	Method
Pilot phase	head of the regional SFS district	Postojna, 13 October 2017	Interview (I1)
	group of local inhabitants organized into the Forest guardians study circle	Postojna, 25 October 2017, n = 7	Interview (I2)
Main phase	regional forestry professionals, representatives of the municipality and the national FC Association	Postojna, 13 October 2017, n = 6	Focus groups (FG1)
	municipality inhabitants	Postojna, 26 November 2018 to 13 December 2018, n = 99	Web-survey (Web1)
	local FC leaders and representatives of local institutions	Slavina, 11 April 2019, n = 7	Focus group (FG2)
Test (post-analysis) phase	regional forestry professionals	Postojna, 13 November 2019, n = 22	Focus group (FG3)
	National inquiry of FC	December 2020, n = 4 for Postojna region	Literature analysis

Table 3: Qualitative data on response to forest damage (web-survey, focus groups).

Thematic area	Question content
Forest (2 questions)	Self-regeneration Importance/use/relation to forests close to your home
Activity of citizens (7 questions)	General activity Frequency of forest visits Purpose of forest visits Roles of forests in the area Awareness of sanitary harvests in the area Interest in learning in a study circle Interest in learning in a forest-related course
Response to large-scale disturbance (7 questions)	Involved individuals, groups, institutions The best respondent FC characterization Explanation/reasoning Differences between the response to primary and secondary forest-damage The key obstacle Future forest management proposals

we analysed the eventual response drivers: geographical (altitude above sea level, terrain slope) and technical characteristics of forest properties (accessibility, defined as the share of property accessible by skidding machinery, technology used) and information on the number of legislative orders. Finally, we calculated response time, harvesting time and realization of legislative orders for each forest owner. Private forest owners were classified into two categories: FC and »other« forest owners. For 26 FC, which received 159 legislative orders, we calculated Pearson correlations between response indicators and eventual response drivers.

Qualitative measures improved the understanding of the decisions and actions of FC. Primary qualitative data were collected by triangulating three methods: semi-structured interviews, focus groups and surveys (Table 3). We also limited potential bias by iterative communication in the four-year period 2017–2020 and with different target groups, some of which intentionally overlapped (professional foresters of the SFS, regional forest owners, FC representatives and general regional population). Qualitative observations started in 2017 with pilot interviews and a focus group. In 2018, a municipal web-survey and a repeated focus group were organized. The third focus group in 2019 and the control from the national survey in 2020 tested the interpretations collected in previous years. A summary of the data collection is presented in Table 2.

Interpretation of the qualitative data was based on the framework of Deuffic, Arts and Sotirov (2018), who proposed five general decision-making profiles.

3 Results

3.1 Forest ownership structure in the area

Nearly 60% of forests in the area are privately owned, covering 47,728 ha (Zavod za gozdove ... 2011). Private properties are fragmented into plots that are predominantly in the size range of 10 to 30 hectares, which is larger than before denationalization. Forest management is attributed to the SFS according to the Forest Act (published in the Official Gazette of the Republic of Slovenia in 1998). Three general problems of private ownership in the area are low motivation, poor road infrastructure (average forest road density amounts to 16.3 m/ha) and the strong influence of wildlife, particularly that of large predators (Zavod za gozdove ... 2011). Private forest owners are predominantly regarded as inactive.

There were 49 FC in the Postojna district in 2011 (Zavod za gozdove ... 2011), and 46 according to the SFS archives in 2017. Their properties are located on the least productive sites (9% (4,300 ha) of the district forests). Part of these sites were planted with spruce before Second World War. FC can be considered as large forest owners, as most of their properties exceed the average size of individually owned forest land (Table 4).

Table 4: FC properties according to the size classes in the Postojna district (Zavod za gozdove ... 2011).

Size class (ha)	No. of FC	Average property size (ha)
< 10	8	5.1
11–30	9	19.9
31–50	6	40.3
51–100	15	71.8
101–300	7	151.0
> 300	4	434.3

Table 5: Size of FC in the observed area by the number of members according SFS archive data from 2017.

Size class (No. of members)	No. of FC	Total members
3–30	6	97
31–60	7	325
61–90	1	70
91–120	1	105
>120	1	250
Missing data	30	?
Total	46	847 +?

The average property size of FC is 88.4 ha, fragmented into approximately 5 parcels (Zavod za gozdove ... 2011, 22). Information on the number of shareholders is scarce. SFS archives provide information on the number of shareholders; therefore, the size per shareholder varies (from 0.1 to 14.3 ha). SFS databases on legislative orders for 2014–2016 provide some insight but with gaps, as 26% of the data on the number of shareholders is missing. The trend of larger average property size up to 2017 is attributed to denationalization in this period.

Large variation is typical both with regard to number (from 7 up to 250 members) and relation to the property (from 20 shareholders possessing 2 ha to 7 shareholders possessing 100 ha), with an average possession of 4 ha per shareholder (Table 5).

The SFS legislative order database for 2014 and 2016 provides information on 26 FC affected by both the ice storm and bark beetles. However, information on the number of shareholders in this database is limited, as data on shareholders are missing for 7 FC.

3.2 Harvest quantity

Legislative orders prescribed a total of 1,264,680 m³ of timber harvested after the ice-break and 694,906 m³ after the insect infestation in the Postojna district. After the ice-break, FC were required to process 6.7% of the total amount. The average harvest per legislative order was 4.2 times higher for FC than that for other private forest owners after the primary disturbance and 1.4 times higher after the secondary disturbance. This reflects the less fragmented forests of FC and relatively large quantities of harvested wood.

The realized harvest in FC forests between 2014 and 2016 was close to that prescribed for FC. Only 4% of the required timber harvest was not realized on disturbed FC plots, while other private forest owners left 57% of the prescribed harvest.

Fully mechanized harvesting dominated the approach of FC. For other private forest owners, motor manual harvesting prevailed (Table 6).

3.3 Response time, harvesting time and realization of prescribed deadlines

Response time indicates how fast FC reacted to legislative orders and refers to the difference between the date of realization of the legislative order and the date of its uptake. Harvesting time indicates the duration of harvesting. Realization of legislative orders reflects the relationship between the conclusion of harvesting and the prescribed harvesting deadline.

An immediate start was initially noticed in the pilot interview (I1) for one FC whose forest was located near the village. Later, FC leaders reported that they were impatiently waiting for the end of the rainy period that followed the ice-break and eventual application for training courses. They changed their mind after becoming aware of the immense scale of the disturbance (FG2) and applied for machinery services. This confirms that they considered time to be very important, which was also recognized by the leaders

Table 6: Proportion of conifers harvested according to the technology used (%) according to the SFS archive.

Forest owner type	Motor Manual	Mechanized	Combined
Forest commons	43	56	1
Other private forest owners	85	10	5

Table 7: Average realization of legislative orders for FC and other private forest owners after primary and secondary forest disturbance (days). Negative figures indicate harvesting before the deadline. The greater the negative figure, the faster the response.

Private forest owner type	Forest commons	Other private forest owners	All
Realization of legislative orders after primary disturbance	-405	-240	-322
Realization of legislative orders after secondary disturbance	-8	4	-2

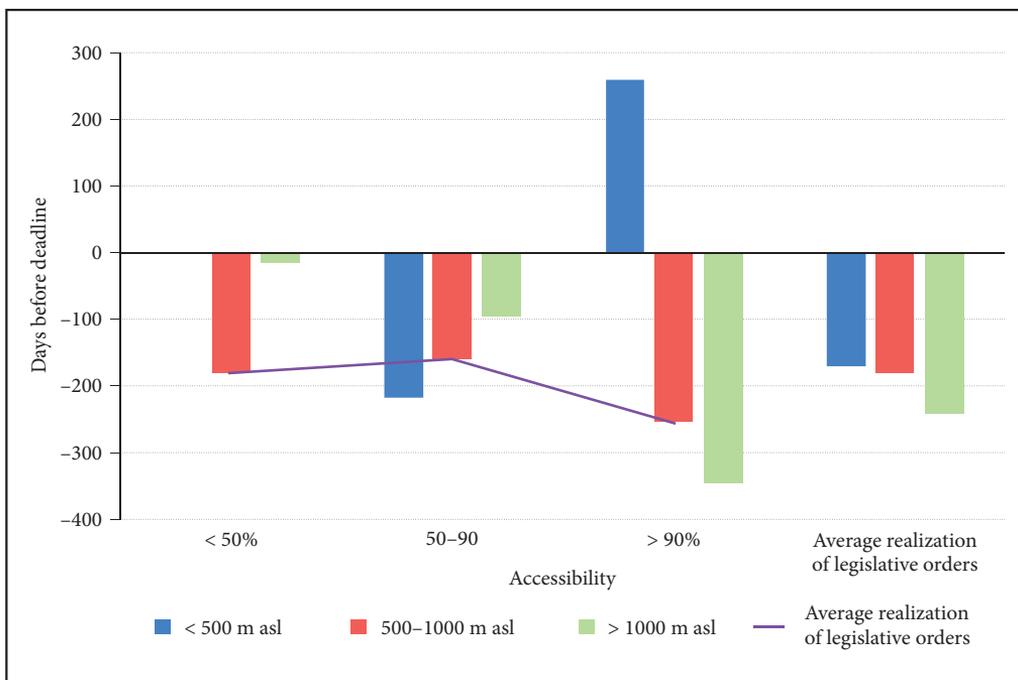


Figure 2: Realization of legislative orders decreases with increasing accessibility. Negative figures indicate realization before the deadline.

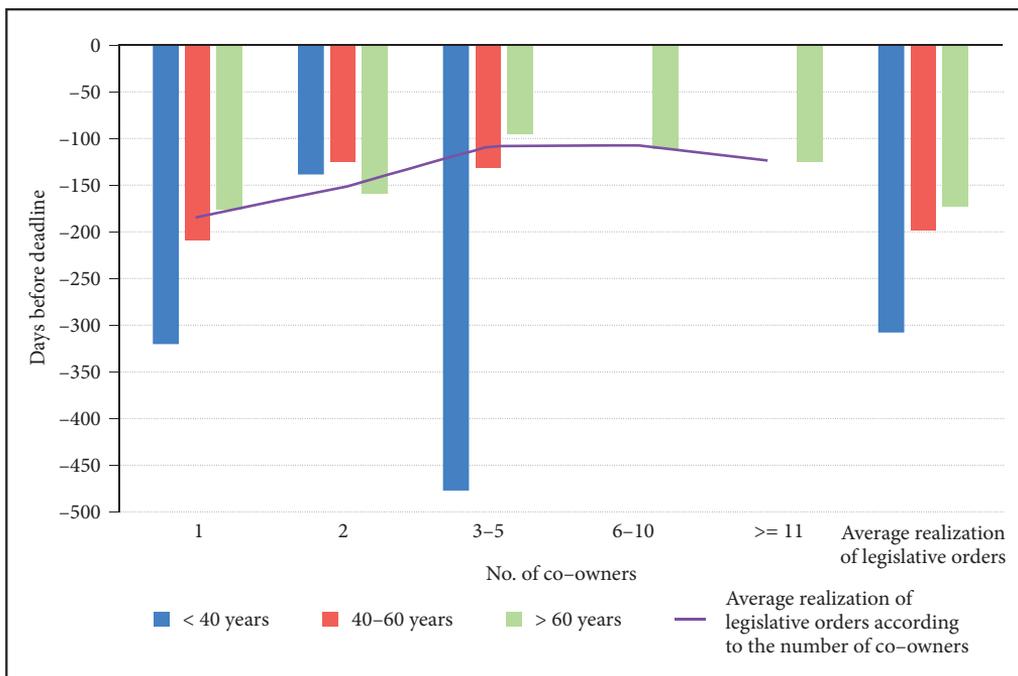


Figure 3: Realization of legislative orders according to the number of co-owners and their average age.

of the SFS: »The first responders were extra-large forest owners, followed by internally well-organized FC« (I1). At least the generally active FC started harvesting as soon as possible.

The average response time ranged from 11 to 422 days of harvesting. An FC with only one legislative order responded in 11 days from its uptake. An FC with 9 legislative orders responded to the first legislative order in 8 days (minimal response time) while the rest of the legislative orders for this FC took up to 120 days to realize their obligations (maximum response time). Realization of legislative orders indicates that all private forest owners completed salvage logging well before official deadlines, especially after primary disturbance while FC were substantially faster (Table 7, Figure 2, Figure 3). FC were on average significantly faster than other private forest owners (Table 7).

Realization of legislative orders logically varies with elevation and forest accessibility. It decreases with increasing accessibility, particularly where it exceeds 50% (Figure 2). There are some puzzling delays at the lowest elevation, which are probably attributed to fragmented parcels, low accessibility or older owners. Fragmentation may play a role in response definition. It is not only the forest that is fragmented but also decisions. However, multiple owners in this study did not take more time to decide, so their decision-making was effective (Figure 3).

Large private forest owners had the fastest realization of legislative orders, followed by FC, as already indicated in the pilot interviews (I1, FG1). Younger private forest owners responded more quickly. Correlations of response indicators with eventual response drivers are presented in Table 8.

Geographical variables are not correlated with the response of FC. Those with high harvest quantities logically needed more time to harvest damaged wood ($p = 0.57$, $p < 0.05$) but also started significantly earlier ($p = -0.17$, $p < 0.05$). Interestingly, average response time declined with increased skidding distance ($p = -0.23$, $p < 0.05$). FC with numerous legislative orders started significantly earlier ($r = -0.35$, $p < 0.05$) and their response time for the last legislative order was significantly longer ($r = 0.42$, $p < 0.05$). The average response time of larger FC was significantly lower ($r = -0.25$, $p < 0.05$), which was already indicated by Figure 3.

However, short harvesting time was not only attributable to relatively large parcels or to the quick response, but also to other factors. For example, a higher share of subsidized pastures, indicating the active management of the FC, stimulated action (I1), while the sudden loss of an FC leader (FG2) suppressed it.

3.4 Interpretations of response indicators

All of the qualitative methods interpreted harvests and highlighted the importance of internal FC processes and their external relationships. The high variability of situations is typical in general (Bavec et al. 2021; Haller et al. 2021) and present in this study of the Postojna region, which is well exemplified by the statement »Each FC is its own story« cited multiple times (I1; FG1; Web1; FG2). The inquiry response rate was minimal (<1%), as we invited all citizens of the municipality. However, the structure of responders was balanced according to gender (53% men, 47% women), location (all local communities participated)

Table 8: Correlations between eventual response drivers. Negative values indicate efficient response.

Response drivers	Response indicators	r	Significance
Geographical variables	Altitude	Response time (average)	0.03 /
	Slope	Response time (average)	-0.03 /
Forest related variables	Amount of wood	Response time (min)	-0.17 /
	Amount of wood	Harvesting time	0.57 $p > 0.05$
	Skidding distance	Response time (average)	-0.23 $p > 0.05$
	Accessibility	Response time (average)	0.31 $p > 0.05$
Other	Number of legislative orders	Response time (min)	-0.35 $p > 0.05$
		Response time (max)	0.42 $p > 0.05$
	Number of FC members ($n_{FC} = 19$)	Response time (average)	-0.25 $p > 0.05$

and ownership (40% of respondents self-declared as forest owners). The main arguments for mobilizing the harvest were twofold: internal and external. The internal arguments were as follows: 1) ownership responsibility and income potential, motivated also by a generally expected increase in property taxes; 2) absence of alternative actors because of slow administration; and 3) different degrees of forest-related competence in FC. These were accompanied by three factors outside of the FC domain: 1) accessibility of forest; 2) share of conifers; and 3) machinery availability. Informants attribute the agility of FC to the immediate response and informed decisions. Informed decisions are part of governance, which in FC is attributed to the management board and its president, as illustrated by two statements: »Foresters on the FC management board were able to decide quickly and correctly, so that potential conflict was limited to the delivery of benefits only« and »Some FC deliberately chose new leadership according to the criteria of experience and competence, for example retired local foresters« (I1). Interdependence between FC and external decision makers was cited as influential: »Communication intensity between FC leaders and state representatives is crucial for forest management« (I2) and »There is a need to strengthen social capital with institutions« (Web 1). Indirect relationships impact efficient response, e.g. lack of professional agreement, organizational difficulties (FG1) and desired autonomy due to negative memories of the past regime (»The less intervention by external agents the better«) (FG3). All informants and methods of observation consistently defined FC governance and leadership selection criteria by 1) respect for the norm of collective benefits including minimal and subordinated personal benefits and 2) forest management competence.

4 Discussion

The decision-making process in forest management is becoming increasingly uncertain due to the effects of global warming. When land is predominantly privately owned, as is the case in Europe, the swift intervention of private forest owners becomes crucial after natural disturbances. Although numerous studies improve our understanding of forest owners, there is a lack of insight into the response of forest commons (FC), which are present throughout Europe (Casas-Cortes, Cobarrubias and Pickles 2014; De Moor 2015; Haller et al. 2021) and Slovenia (Bogataj and Krč 2014; Lawrence et al. 2021; Bavec et al. 2021)). The specific governance model of FC is critical for resource sustainability (Bodin 2017; Tucker et al. 2023), especially when natural disturbances disrupt the system. Studying the response of FC to extreme natural disturbances is interesting because FC members share land and path-dependent relationships (Gatto and Bogataj 2015; Šmid Hribar et al. 2018). They are large forest owners in the study area and in Slovenia. The share of their property type in Postojna area is three times higher than the national share (Premrl et al. 2015). Their property is not fragmented than other private properties. Furthermore, their interpretation of the extreme event was not catastrophic, in contrast to the shocking reports in the local and national media. Most members are over 60, experienced and cooperative (Bavec et al. 2021). They are not equipped for the safe and efficient mechanisation expected for large forest owners, so their high average harvest ordered by the SFS represented a sudden and substantial pressure, now documented as being realized quickly, within prescriptions, and with 56% of the operations using mechanized harvesting, which is substantial in comparison with 10% mechanized harvesting done by other types of forest owners. The local tradition of FC forest management developed through learning loops during regular ice-breaks of smaller scale therefore resulted in an effective response to the sudden large-scale challenge. FC consist of several members, organized into a group with elected leadership. The fast response of older, experienced forest owners hypothesized by de Groot, Ogris and Kobler (2018) was enhanced with new insights, even though Figure 3 underscores the fast response of young forest owners. Active FC reacted immediately, changing their initial decision from training to hiring machinery services. FC efficiently fulfilled their private and public duties (FG3; Šmid Hribar et al. 2018). Prescriptions played only a minor role (compared to de Groot, Ogris and Kobler 2018), while relatively large plots and the amount of sanitary felled spruce were important. Response was limited where plots were inaccessible and/or the internal cohesion of FC was sometimes dysfunctional. In such cases SFS enforcement could not have had an impact. Since FC prioritized conifers after the ice-break, bark beetles later caused few problems. Despite individual suboptimal response, on average past investments by FC in self-organization and governance resulted in a comparatively better harvest response to an extreme unexpected event (Table 7, I1, Figure 3).

4.1 Response drivers

The qualitative data consistently, and sometimes explicitly, suggest that social norms are the main driver of collective action of FC, which is in line with the international literature (Holt et al. 2021). The active and rapid response of FC is an interesting finding given the decades of their suppression (Bogataj and Krč 2014; Premrl et al. 2015), the general attribute of passivity of forest owners and the low public awareness of FC at the municipal (Web1), national (Bavec et al. 2021) and European level (Lidestav et al. 2017; Lawrence et al. 2020). For example, only 27% of respondents to the municipal inquiry recognized FC as private forest owners (Web 1). A redundant question in this inquiry asking who was the main driver of the response yielded responses of »ownership responsibility« (77%), which is indicative of social norms, and »income potential« (43%), which is ultimately subordinate. The SFS was cited as a minor driver but with recognition of its competence in »demanding bureaucratic procedures«. As FC have not yet been analysed in relation to harvesting behaviour, identification of their key drivers might be important for future post-disturbance strategies:

- Economies of scale (also taking into account site accessibility, location within the ice-break, proportion of spruce);
- Social relationships (internal FC cohesion in terms of trust and social capital);
- Group action and its leadership experience and competence.

This is consistent with the literature, where the environment, knowledge (competence) and social norms consistently dominate in the decision-making arguments of stakeholders (Deuffic, Arts and Sotirov 2018; Holt et al. 2021). We are unable to determine their relative importance, but they consistently support the interpretation of rapid harvesting.

As communities of practice, FC regulate forest management and relationships, both internal and external. They practice collaborative governance (Bodin 2017) and are able to mobilize experiential knowledge from past ice-breaks. They prioritize leadership quality and reputation over the number of members. Furthermore, their revived, informed and conifer-focused collective action prevented bark beetle gradation despite the high average age of FC members, their presumed lower formal education and their independence from harvesting income. This means that structural indicators do not provide the best insight into the qualities of FC.

The justifications for the active response are clearly in agreement with the theory of communicative action and practice theory (Deuffic, Arts and Sotirov 2018; Wenger 2000). Furthermore, the logics of cognition and practice described by Deuffic, Arts and Sotirov (2018) were more important than those of interest and appropriateness that support eventual conformity to imposed rules. The findings do not oppose those of another model developed in Slovenia based on individual data about forest management conceptualizations (Ficko 2019). Cross-checking the response drivers with a reverse question about barriers to active response confirmed that the activity (or passivity) of private forest owners refers to both internal and external cooperation (which may be dysfunctional), as well as to information flow. This is consistent with studies in the developing world (Magomedova 2015) that link prosocial behaviour with responses to extreme natural events.

Generally, large-scale environmental extremes represent a push that mobilizes diverse actors. The main factors influencing the response of private forest owners were norms, the environment and competence. Although competence can be problematic in a society in transition (Premrl et al. 2015; Lidestav et al. 2017; Theesfeld 2018; Šmid Hribar et al. 2018; Vasile 2019; Weiss and Nichiforel 2020), our analysis presents a vibrant rural society able to build shared meanings and actively respond. This may also be a relevant model for other European contexts (Vriens and De Moor 2020). Recognition of local joint management structures may benefit processes of adaptation to climate change. However, in Slovenia, FC are currently recognized as examples of good practice (Šmid Hribar et al. 2023) and sometimes as owners of relatively large properties, rather than as a model as proposed in the European literature (Lidestav et al. 2017; Weiss et al. 2017; Weiss et al. 2019; Lawrence et al. 2020).

4.2 Limitations of the study

The most important limitation is the fact that the sample covers less than half of private forest owners in the observed area and only part of FC. Furthermore, generalizations are limited by the high degree variation in

FC functioning. The response of FC was unevenly spread: some self-organized, while others waited for state measures or the action of neighbours. The role of the wood market and insurance was not analysed or mentioned in the qualitative observations. Collective action among co-owners after inheritance is hampered by a lack of leadership (FG2); internal cohesion may have eroded during periods of the Second World War and the undemocratic regime that followed. Competent individuals are not equally distributed and may be marginalized. We cannot draw definite conclusions about the importance of age due to a lack of these and other data on the social structure of the FC.

Non-respondents in the qualitative analysis remain a challenge for the future work. The reasons for inactivity are diverse and mostly social (emigration, alternative income, property fragmentation, lack of knowledge, poor technical equipment, irresponsibility, physical incapacity, mistrust, etc.). Inactive private forest owners remain dependent on preconditions for the activation of FC being met and on the priorities of coordinating action in each specific situation. Further analysis should compare equal sizes of individual and collective private properties and contextual analysis through systematic long-term observation.

5 Conclusions

Ecosystems and societies are increasingly destabilized by extreme weather events due to climate change. Regional empirical data on the post-disturbance forest management intervention of FC provide insights into their effective response through their immediate and rapid concerted action. They harvested damaged coniferous forest stands with machinery services well before the deadline and before other forest owners (except large individual forest owners). Iterative qualitative assessments shed light on various response drivers, including social norms of responsibility and forest management competence. This means that even if some FC remain dependent on external empowerment, most have revived the traditional collective action of FC and shifted from passive to active.

The practical implications of this analysis lie in organizational approaches in the wake of natural disasters. Professional, timely and efficient private forest owner response requires the following:

- a. Avoiding generalized measures for artificial target groups in favour of contextualized real local communities.
- b. Recognizing and supporting existing FC and the pre-conditions for their collective action.
- c. Maintaining resilience in circumstances of increased uncertainty.

7 References

- Andersson, E., Keskitalo, C. H., Bergstén, S. 2018: In the eye of the storm: adaptation logics of forest owners in management and planning in Swedish areas. *Scandinavian Journal of Forest Research* 33-8. DOI: <https://doi.org/10.1080/02827581.2018.1494305>
- Bavec, J., Beguš, V., Bogataj, N., Bohinec, C., Bradaškja, B., Breška, D., Brezavšček, M., et al. 2021: Slovenske srenje kot izročilo in priložnost. Ljubljana.
- Bodin, Ő. 2017: Collaborative Environmental governance: Achieving collective action in social- ecological systems. *Science* 357-6352. DOI: <https://doi.org/10.1126/science.aan1114>
- Bogataj, N., Krč, J. 2014: A Forest Commons Revival in Slovenia. *Society and Natural Resources: An International Journal* 27-8. DOI: <https://doi.org/10.1080/08941920.2014.918225>
- Bogataj, N. 2010: Lastnice gozda kot prezrt zgled: prispevek k celovitejšemu razumevanju starih ljudi v Sloveniji. *Kakovostna starost: časopis za socialno gerontologijo in gerontagogiko* 13-1.
- Canadas, M. J., Novais, A. 2014: Bringing local socioeconomic context to the analysis of forest owners' management. *Land Use Policy* 41. DOI: <https://doi.org/10.1016/j.landusepol.2014.06.017>
- Rodríguez-Carreras, R., Úbeda, X., Francos, M., Marco, C. 2020: After the Wildfires: The Processes of Social Learning of Forest Owners' Associations in Central Catalonia, Spain. *Sustainability* 12. DOI: <https://doi.org/10.3390/su12156042>
- Casas-Cortés, M., Cobarrubias, S., Pickles, J. 2014: The Commons. A Companion to Urban Anthropology. Chichester. DOI: <https://doi.org/10.1002/9781118378625.ch26>
- Colding, J., Bartel, S. 2019: Exploring the socio-ecological systems discourse 20 years later. *Ecology and Society* 24-1. DOI: <https://doi.org/10.5751/ES-10598-240102>

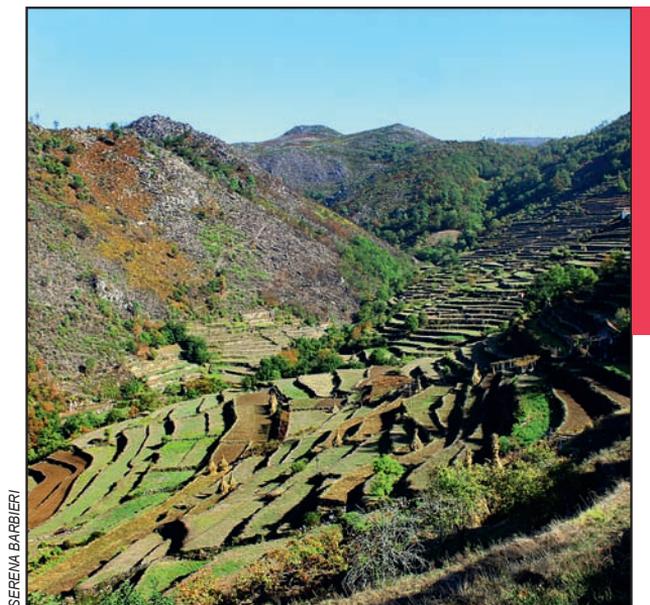
- Češarek, D., Ficko, A., Bončina, A. 2018: Vplivni dejavniki poseka v zasebnih gozdovih Slovenije v obdobju 1995-2014. *Acta Silvae et Ligni* 115. DOI: <https://doi.org/10.20315/ASetL.115.3>
- Čoderl, J., Jamnik, Z., Bogataj, N. 2012: Povezovanje lastnikov gozdov in učenje za skupno gospodarjenje – izkušnje KE Radlje. Povezovanje lastnikov gozdov in skupno gospodarjenje. *Gozdarski študijski dnevi* 29. Ljubljana.
- de Groot, M., Ogris, N., Kobler, A. 2018: The effects of a large-scale ice storm event on the drivers of bark beetle outbreaks and associated management practices. *Forest Ecology and Management* 408. DOI: <https://doi.org/10.1016/j.foreco.2017.10.035>
- De Moor, T. 2015: The dilemma of the Commoners. Understanding the Use of Common-Pool Resources in Long-Term Perspective. Cambridge. DOI: <https://doi.org/10.1017/CBO9781139135450>
- The Orientgate Network 2014: Adapted Forest Management in Austria. Pilot Study 1. Vienna.
- Deuffic P., Arts, B. J. M., Sotirov, M. 2018: »Your policy, my rationale«. How individual and structural drivers influence European forest owners' decisions. *Land Use Policy* 79. DOI: <https://doi.org/10.1016/j.landusepol.2016.09.021>
- Eriksson, L. 2017: The importance of threat, strategy and resource appraisals for long-term proactive risk management among forest owners in Sweden. *Journal of Risk Research*. 20-7. DOI: <https://doi.org/10.1080/13669877.2015.1121905>
- Ewers, C. 2010: Gemeinschaftswald in Nordrhein-Westfalen. In *Der Gemeinschaftswald in Nordrhein-Westfalen*. Heft 20 der Schriftenreihe der Landesforstverwaltung Nordrhein-Westfalen, eds. Landesbetrieb Wald und Holz Nordrhein-Westfalen. Münster.
- Food and Agriculture Organization of the United Nations 2018: FRA 2020 Terms and Definitions. Forest resources assessment working paper 188. Rome.
- Ficko, A., Bončina, A. 2013: Probabilistic typology of management decision making in private forest properties. *Forest Policy and Economics* 27. DOI: <https://doi.org/10.1016/j.forpol.2012.11.001>
- Ficko, A., Lidestav, G., Ni Dhubháin, A., Karppinen, H., Zivojinovic, I., Westin, K. 2019: European private forest owner typologies: A review of methods and use. *Forest Policy and Economics* 99. DOI: <https://doi.org/10.1016/j.forpol.2017.09.010>
- Ficko, A. 2019: Private Forest Owners' Social Economic Profiles Weakly Influence Forest Management Conceptualizations, *Forests* 10-11. DOI: <https://doi.org/10.3390/f10110956>
- Ficko, A., Bončina, A. 2019: Public attitudes toward environmental protection in the most developed countries: the environmental concern Kuznets curve theory. *Journal of environmental management*. 231-1 DOI: <https://doi.org/10.1016/j.jenvman.2018.10.087>
- Gatto, P., Bogataj, N. 2015: Disturbances, robustness and adaptation in forest commons: comparative insights from two cases in the Southeastern Alps. *Forest Policy and Economics* 58. DOI: <https://doi.org/10.1016/j.forpol.2015.03.011>
- Gašperšič, F. 2008: Mesto snežniških gozdov v razvoju napredne gozdnogospodarske misli in prakse na Slovenskem, *Gozdarski vestnik* 66.
- Haller T., Liehti, K., Stuber, M., Viallon, F. X., Wunderli, R. (eds.) 2021: *Balancing the Commons in Switzerland. Institutional Transformations and Sustainable Innovations*. London. DOI: <https://doi.org/10.4324/9781003043263>
- Hartebrodt, C. 2004: The Impact of Storm Damage on Small-scale Forest Enterprises in the South-Werst Germany. *The Small-Scale Forest Economics, Management and Policy* 3-2. DOI: <https://doi.org/10.1007/s11842-004-0015-0>
- Harvey, D., 2012: *Rebel Cities: From the Right to the City to the Urban Revolution*. London.
- Holt, J. R., Butler, B. J., Borsuk, M. E., Markowski-Lindsay, M., MacLean, M.G., Thompson, J. R. 2021: Using the Theory of Planned Behavior to Understand Family Forest Owners' Intended Responses to Invasive Forest Insects. *Society and Natural Resources* 34-8. DOI: <https://doi.org/10.1080/08941920.2021.1924330>
- Krajnc, N., Hafner, P., Jemec, T., Stare, D., Karisch-Gierer, D., Janusch, E., Gaube, H. et al. 2021: Collected needs of women and wider gender perspectives in forestry. Report, *Forest in women's hands (Fem4Forest)*.
- Krč, J., Pezdevšek Malovrh, Š., Mihelič, M., Zadnik Stirn, L. 2008: Assessment of factors which influence forest owners to join associations. Proceedings of the International Symposium on Emerging Needs of Society from Forest Ecosystems: towards the Opportunities and Dilemmas in Forest Managerial Economics and Accounting. Ljubljana.

- Kumer, P., Pezdevšek Malovrh, Š. 2019: Factors hindering forest management among engaged and detached private forest owners: Slovenian stakeholders' perceptions. *Small-Scale Forestry* 18-1. DOI: <https://doi.org/10.1007/s11842-018-9409-2>
- Kutnar, L., Kermavnar J., Pintar, A. M. 2021: Climate change and disturbances will shape future temperate forests in the transition zone between Central and SE Europe. *Annals of Forest Research* 64-2. DOI: <https://doi.org/10.15287/afr.2021.2111>
- Janssen, M. 2015: A behavioural perspective on the governance of common resources. *Current Opinion In Environmental Sustainability* 12. DOI: <https://doi.org/10.1016/j.cosust.2014.08.002>
- Lawrence, A. 2017: Adapting through practice: Silviculture, innovation and forest governance for the age of extreme uncertainty. *Forest Policy and Economics* 79. DOI: <https://doi.org/10.1016/j.forpol.2016.07.011>
- Lawrence, A., Gatto, P., Bogataj, N., Lidestav, G. 2020: Forests in common: Learning from diversity of community forest arrangements in Europe. *Ambio* 50. DOI: <https://doi.org/10.1007/s13280-020-01377-x>
- Lidestav, G., Bogataj, N., Gatto, P., Lawrence, A., Stjernström, O., Wong, J. 2017: Forests in Common and Their Contribution to Local Development. *Globalisation and Change in Forest Ownership and Forest Use, Natural Resource Management in Transition*, Umea. DOI: https://doi.org/10.1057/978-1-137-57116-8_8
- Lidskog, R., Sjödin, D. 2016: Risk governance through professional expertise. *Forestry consultants' handling of uncertainties after a storm disaster*, *Journal of Risk Research*, 19-10. DOI: <https://doi.org/10.1080/13669877.2015.1043570>
- Magomedova, M. 2015: Behavioural Response to Natural Disasters. *Seminal Paper*, Friedrich-Alexander University Erlangen-Nuremberg. Erlangen.
- Mantilla, C. 2018: Environmental uncertainty in commons dilemmas: A survey of experimental research. *International Journal of the Commons* 12-2. DOI: <https://doi.org/10.18352/ijc.857>
- Marzano, M., Blennow, K., Quine, C. 2013: Risk management and risk perception-understanding the social mobilization threat of storm damage. *Living with Storm Damage To Forests*. Joensuu.
- Medved, M. 2003: Posestne razmere in pridobivanje lesa v zasebnih gozdovih. *Gozdarski vestnik* 61-9.
- Mori, J., Poljanec, A. 2019: Trenutne aktivnosti in izzivi pri preprečevanju škod v gozdovih zaradi ekstremnih naravnih pojavov. *Gozd in les kot priložnost za regionalni razvoj*. *Proceedings of Strokovni forum Festival lesa*. Kočevje.
- Nichiforel L., Deuffic P., Jellesmark Thorsen B., Weiss G., Hujala T., Keary K. et al. 2020: Two decades of forest-related legislation changes in European countries. *Forest Policy and Economics* 115. DOI: <https://doi.org/10.1016/j.forpol.2020.102146>
- Pagdee, A., Kim, Y. S., Daugherty, P.J. 2004: What Makes Community Forest Management Successful: A Meta-Study From Community Forests Throughout the World, *Society and Natural Resources* 19-1. DOI: <https://doi.org/10.1080/08941920500323260>
- Pezdevšek Malovrh, Š., Nonić, D., Glavonjić, P., Nedeljković, J., Avdibegović, M.; Krč, J. 2015: Private Forest Owner Typologies in Slovenia and Serbia: Targeting Private Forest Owner Groups for Policy Implementation. *Small-Scale Forestry* 14. DOI: <https://doi.org/10.1007/s11842-015-9296-8>
- PIAAC Expert Group in Problem Solving in Technology-Rich Environments 2009: *PIAAC Problem Solving in Technology-Rich Environments: A Conceptual Framework*, OECD Education Working Papers 36. Paris. DOI: <https://doi.org/10.1787/220262483674>
- Poje, A., Pezdevšek Malovrh, Š., Krč, J. 2016: Factors affecting harvesting intensity in small-scale private forests in Slovenia. *Small-scale forestry* 15-1. DOI: <https://doi.org/10.1007/s11842-015-9309-7>
- Premrl, T., Udovč, A., Bogataj, N., Krč, J. 2015: From restitution to revival: a case of commons re-establishment and restitution in Slovenia. *Forest Policy and Economics* 59. DOI: <https://doi.org/10.1016/j.forpol.2015.05.004>
- Qin, J., Chen, Y., Kang, Y., Perc, M. 2017: Social diversity promotes cooperation in spatial multigames. *EPL A letters Journal exploring the Frontiers of Physics* 118. DOI: <https://doi.org/10.1209/0295-5075/118/18002>
- Saje, R. 2014: Žledolomi v slovenskih gozdovih Ice storm damages in Slovenian Forests. *Gozdarski vestnik* 72-4.
- Seidl R., Thom, D., Kautz, M., Margin-Benito, D., Peltoniemi, M., Vacchiano, G., Wild, J. et al. 2017: Forest disturbances under climate change. *Nature Climate Change* 7. DOI: <https://doi.org/10.1038/nclimate3303>
- Sinjur, I., Vertačnik, G., Likar, L., Hladnik, V., Miklavčič, I., Gustinčič, M. 2014: Žledolom januarja in februarja 2014 v Sloveniji – prostorska in časovna spremenljivost vremena na območju dinarskih pokrajin. *Gozdarski vestnik* 72-7, 8.

- Stare, D., Grošelj, P., Pezdevšek Malovrh, Š. 2020: Ovire in rešitve pri sanaciji v ujmah poškodovanih zasebnih gozdov. *Acta Silvae et Ligni* 123. DOI: <https://doi.org/10.20315/ASetL.123.2>
- Stare, D., Grošelj, P., Pezdevšek Malovrh, Š. 2022: Decision Support Framework for Evaluating The Barriers To Salvage Logging: A Case Study on Private Forest Management in Slovenia. *Environmental Management*. 71-5. DOI: <https://doi.org/10.1007/s00267-022-01712-w>
- Šmid Hribar, M., Kozina, J., Bole, D., Urbanc, M. 2018: Public goods, common-pool resources, and the commons: The influence of historical legacy on modern perceptions in Slovenia as a transitional society. *Urbani izziv* 29-1. DOI: <https://doi.org/10.5379/urbani-izziv-2018-29-01-004>
- Šmid Hribar, M., Hori, K., Urbanc, M., Saito, O., Zorn, M. 2023: Evolution and new potentials of landscape commons: insights from Japan and Slovenia. *Ecosystem services* 59. DOI: <https://doi.org/10.1016/j.ecoser.2022.101499>
- Šmid Hribar, M., Urbanc, M., Zorn, M. 2023: Commons and their contribution to sustaining Slovenian cultural landscapes. *Acta Geographica Slovenica* 63-2. DOI: <https://doi.org/10.3986/AGS.11591>
- Theesfeld, I. 2018: The role of pseudo-commons in post-socialist countries. *Routledge Handbook of the Study of the Commons*. London.
- Tucker, C. M., Šmid Hribar, M., Urbanc, M., Bogataj, N., Gunya A., Rodela, R., Sigura, M., Piani, L. 2023: Governance of interdependent ecosystem services and common pool resources. *Land Use Policy* 127. DOI: <https://doi.org/10.1016/j.landusepol.2023.106575>
- Unay-Gailhard, I., Bojnec, Š. 2021: Public support effect on natural disaster management: A case study of ice-storms in forests in Slovenia. *Land Use Policy* 95. DOI: <https://doi.org/10.1016/j.landusepol.2019.01.014>
- Vasile, M. 2019: Enlivenment of institutions: emotional work and the emergence of contemporary land commons in the Carpathian Mountains. *Journal of Environmental Planning and Management* 62-1. DOI: <https://doi.org/10.1080/09640568.2018.1500354>
- Veselič, Ž., Grecs, Z., Kolšek, M., Oražem, D., Marijašič, D., Beguš, J. 2015: Žled v slovenskih gozdovih in njihova sanacija. *Ujma* 29.
- Vilhar, U., Kermavnar, J., Kozamernik, E., Petrič, M., Ravbar, N. 2022: The effects of large-scale forest disturbances on hydrology – An overview with special emphasis on karst aquifer systems. *Earth-Science Reviews* 235. DOI: <https://doi.org/10.1016/j.earscirev.2022.104243>
- Vriens, E., De Moor, T. 2020: Mutuals on the Move: Exclusion Processes in the Welfare State and the rediscovery of Mutualism. *Journal of Social Inclusion* 8-1. DOI: <https://doi.org/10.17645/si.v8i1.2125>
- Weiss, G., Lawrence, A., Lidestav, G., Feliciano, D., Hujala, T. 2017: Changing Forest Ownership in Europe – Main Results and Policy Implications: COST Action FP1201 FACESMAP POLICY PAPER. EFICEEC-EFISEE. Report, European Forest Institute Central-East and South-East European Regional Office.
- Weiss, G., Lawrence, A., Lidestav, G., Feliciano, D., Hujala, T., Sarvašova, Z., Dobšinska, Z. et al. 2019: Research trends: Forest ownership in multiple perspectives. *Forest Policy and Economics* 99. DOI: <https://doi.org/10.1016/j.forpol.2018.10.006>
- Weiss, G., Nichiforel, L. 2020: Concepts and definitions of forest ownership. *Who Owns our Forests? Forest Ownership in the ECE Region*. Genova. DOI: <https://doi.org/10.18356/7dc640e2-en>
- Wenger, E. 2000: *Communities of Practice and Social Learning Systems*. Organization 7-2.
- Wong, J., Posavec, S., Bogataj, N. 2019: Mapping the Space between Public and Private Forest Ownership in Europe. *Who Owns our Forests? Forest Ownership in the ECE Region*. Genova. DOI: <https://doi.org/10.18356/7dc640e2-en>
- Xiao, Q., Xiao, Y., Liu, Y., Tao, J., 2020: Driving forest succession in karst areas of Chongqing municipality over the past decade. *Forest Ecosystems* 7-3. DOI: <https://doi.org/10.1186/s40663-020-0213-z>
- Zavod za gozdove Slovenije, območna enota Postojna 2012: *Gozdnogospodarski načrt gozdnogospodarskega območja Postojna (2011 – 2020)* Št. 05/11. Postojna.

COMMON LANDS, LANDSCAPE MANAGEMENT AND RURAL DEVELOPMENT: A CASE STUDY IN A MOUNTAIN VILLAGE IN NORTHWEST PORTUGAL

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Terraced landscape of Sistelo village, framed by forest and pastures
in common lands (Alto Minho – Portugal).

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Common lands, landscape management and rural development: A case study in a mountain village in northwest Portugal

ABSTRACT: Sustainable landscape management is a key aspect for the development of mountain areas, especially where communities historically held common lands. Mountains face depopulation and abandonment, and transition to multifunctional landscapes emerges as an opportunity. We present a village case study (NW Portugal) focusing on people's perceptions and practices around the common land. Results confirm the common plays a central role in local identity, being perceived as shared heritage with potential to provide multiple benefits. Traditional uses and governance practices are prevalent, revealing inertia in adapting to new users and goals. Public support targeting common land management skills would facilitate these transitions, as well as to overcome lasting effects of former authoritarian regime.

KEY WORDS: traditional commons, multifunctional landscape, rural development, mountain, Portugal

Skupna zemljišča, upravljanje pokrajin in razvoj podeželja: študija primera gorske vasi na severozahodu Portugalske

POVZETEK: Trajnostno upravljanje pokrajin je ključni vidik razvoja gorskih območij, zlasti pa tam, kjer so bila zemljišča tradicionalno v skupni lasti. Z gorskih območij se ljudje odseljujejo in jih zapuščajo, zato je zanje prehod na večfunkcionalne pokrajine dobra priložnost za nadaljnji razvoj. Avtorji v članku predstavijo primer vasi na severozahodu Portugalske, pri čemer se osredotočijo na mnenja ljudi in prakse, povezane s skupnimi zemljišči. Njihovi izsledki potrjujejo, da imajo skupna zemljišča v lokalni identiteti pomembno vlogo, saj jih ljudje dojemajo kot skupno dediščino, ki lahko prinaša različne koristi. Prevladujejo tradicionalni načini rabe in tradicionalne upravljalvske prakse, pri čemer se kaže pasivnost ljudi in nepripravljenost prilagajanja novim uporabnikom in ciljem. Državna podpora spretnostim upravljanja skupnih zemljišč bi pospešila spremembe, hkrati pa bi pomagala odpraviti dolgotrajne posledice nekdanjega avtoritarnega režima.

KLJUČNE BESEDE: tradicionalna skupna zemljišča, večfunkcionalna pokrajina, razvoj podeželja, gore, Portugalska

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1 Introduction

European mountain landscapes management is a particularly challenging governance problem within wider rural development and nature conservation issues. Many of these landscapes have been shaped and maintained for centuries by local communities, in complex agroecosystems combining private lands and common lands (De Moor 2011; O'Rourke, Charbonneau and Poinot 2016; Haller et al. 2021). This is also the case of the Portuguese mountainous landscapes, where large extensions higher lands, mainly forests, shrublands and pastures, have been historically managed and used in common by local peasant communities (Brouwer 1995; Lopes et al. 2013; Baptista 2014).

In the past, Portuguese common lands, the »*baldios*«, were integrated in agro-silvo-pastoral productive systems, providing multiple goods and services to local communities (Lopes et al. 2013; Baptista 2014). Many of the European historical common lands have been lost during the last two centuries, either by privatization or by the transference of land tenure and/or operational management to central state or local administrations (De Moor 2011; Skulska et al. 2020). Others have survived until today, after long periods of conflicts and dispossession, as it was the case of Portuguese *baldios* (Brouwer 1995; Lopes et al. 2013; Baptista 2014; Skulska et al. 2020), and of the very similar Galician (Spain) *montes veciñales* (Soto 2017). After Elinor Ostrom's findings supporting community-based sustainable commons management (Ostrom 1990; Mckean and Ostrom 1995; Ostrom 2010) but also under more democratic and inclusive political and social values and governance models, several countries introduced legal and political reforms that reinstate or reinforce the rights of local communities over land and natural resources and community-based governance institutions (Skulska et al. 2020; Šmid Hribar et al. 2023). In this recent context, with highly urbanized and growingly environmentally concerned societies, local communities with common lands face new and demanding governance challenges, with common lands representing both an opportunity and a responsibility (Haller et al. 2021; Lopes et al. 2013; Baptista 2014; Soto 2017).

Transformations of historical common lands – how they are perceived, used, managed and who is involved – are multiple and diversified (Šmid Hribar et al. 2023), even in places with long established and politically recognized common lands institutions as the Swiss Alps (Haller et al. 2021). Some communities and territories are better equipped to successfully manage common lands than others. Elinor Ostrom's design principles helped to frame the analysis of commons management, and to identify relevant factors for more efficient, equitable and sustainable local governance (Ostrom 2010). Recent research expanded this theoretical framework, with newer concepts and added regional and local case studies, enlarging the analysis to embrace innovative communities and processes, and more dynamic settings (Soto 2017; Nieto-Romero et al. 2019; Šmid Hribar et al. 2023). Additional research is needed to explore this diversity, to clarify how contemporary rural communities and territories are coping with the challenges of collectively managing common lands, and which wider political and governance systems perform better in enhancing local communities' management role. This is particularly relevant for mountainous landscapes, considering that many are still facing intense depopulation trends and persistent socioeconomic vulnerabilities (Torre 2015; O'Rourke, Charbonneau and Poinot 2016; Pinilla and Sáez 2021). As literature review shows, success in local commons management does not depend only on local actors and institutions. It depends also on larger institutions and governmental agencies governance models being supportive of local communities', empowering them as owners and managers of local common lands. Giving a more prominent and participatory role for local communities and commoners' institutions seems to be in need, even in contexts with less disputed communal rights and roles than in Portugal (Haller et al. 2021). This idea is also the case for general rural development policies, with participatory rural planning being considered a necessary process to stimulate more rooted, collaborative, and creative people and rural communities (Pinilla and Sáez 2021).

In this article we explore the links between rural development, common lands and landscape sustainable management considering Elinor Ostrom work and more recent research findings and relating them to the case of the Alto Minho Portuguese region. This northwestern mountainous and hilly Portuguese region is rich in historically rooted common lands, that traditionally played important roles for local communities (Baptista 2014). After a long period of agricultural decline, rural exodus, and aging, combined with decades of State common lands appropriation, Portuguese rural communities and the common lands institutions are no longer traditional peasant villages. There is a lack of knowledge about current common land management challenges and opportunities and how they relate with wider rural development changes, which

include intense rural depopulation, but also emerging transitions into more multifunctional economies and landscapes, with increased tourism and nature conservation functions adding to traditional farming, pastoral and forestry related activities (Pereira et al. 2005; Madureira et al. 2013; Luz 2017; Nogueira, Simões and Araújo et al. 2020). In this article we present an in-depth village level case study, focusing on the local people perspectives about the common land. By the analysis of people's expectations, difficulties, and perceptions around their *baldio* we intend to clarify how is the community currently involved in the common land use and management. By introducing retrospective and prospective questions and topics, we also intend to frame these perceptions and expectations in the wider context of governance system evolution and in the local development trends, including increased multifunctionality. Finally, the study aims to clarify the challenges faced by community to sustain and to improve common land management in inclusive and sustainable ways, as this information is relevant to guide future research and to elaborate policy recommendations.

1.1 Rural development, mountain landscape management and sustainability

In a highly urbanized world, facing a global environmental crisis, the development of rural areas, with their multiple natural resources, acquires a social and political centrality that is much greater than their demographic weight (Torre 2015). While many rural areas continue to lose population and economic activities others, including remote rural areas, have regained attractiveness following long periods of depopulation (Torre 2015; Pinilla and Sáez 2021). Contemporary rural development issues are linked to the enlarged societal perception of the fundamental functions and resources rural areas and rural people play in the transition to a more sustainable future (Torre 2015). On the other hand, even with less population, rural areas in developed countries may have more resources today than at any time before, providing opportunities for other ways of life, linked to environmental and social qualities present in small communities (Pinilla and Sáez 2021). The development trajectory of a particular rural community depends on the local protagonist's organization, talents, and commitment, but also on active strategic cohesion policies enhancing and supporting local communities and projects (Pinilla and Sáez 2021).

Contemporary environmental sustainability concerns are linked to an increasing recognition of the value and relevance of ecosystem goods and services generated in mountain landscapes (Gløersen et al 2004; Korner and Ohsawa 2005; O'Rourke, Charbonneau and Poinot 2016; Scheurer et al. 2018). Ecosystem services (ES) provided by mountain landscapes depend on biophysical conditions, but also on land cover patterns and management practices, with traditional farming and forestry productive systems being associated with higher environmental value and economic prospects (Madureira et al. 2013; Scheurer et al. 2018; Ribeiro and Šmid Hribar 2019). Persistence of traditional land-based productive activities is linked to the maintenance of mosaic multifunctional landscapes, with more biodiversity, less fire proneness, and more attractive and culturally valued landscapes (Agnoletti 2014; O'Rourke, Charbonneau and Poinot 2016; Honrado et al. 2017; Scheurer et al. 2018). These reasons motivate researchers and policymakers to look for more adequate policies and governance systems to safeguard the remaining traditional landscapes and communities, and to support the maintenance of multifunctional landscapes (O'Rourke, Charbonneau and Poinot 2016; Scheurer et al. 2018; Nishi et al. 2021).

In places where common lands represent a considerable share of landscapes, the success or failure of communal institutions may have important impacts in the viability of rural communities' social life and economy, as well as in the highlands landscapes capacity to provide ES for the society at large, including biodiversity conservation and resilience to climatic change and to wildfires (Baptista 2014; Lopes et al. 2015; Soto 2017; Haller et al. 2021; Serra, Detotto and Vannini 2022). Scientific interest on the commons, including traditional common lands, has increased since Elinor Ostrom was awarded a Nobel Prize, recognizing the significance of the findings resulting from a systematic analysis of case-studies of community-based management and use of natural resources all around the world (Ostrom 1990; McKean and Ostrom 1995; Ostrom 2010; Ostrom et al. 2012). These works emphasized the relevance of local knowledge and local organizational capacity, involving people who use and directly benefit from a system of natural resources, to ensure a set of rules and decision-making institutions adequate for long-term socioeconomic and environmental sustainability.

More recently, it has also been stressed that common lands and common land management practices (commoning) represent an opportunity for enhancing social local identity and cohesion, improved natural

heritage stewardship, and for the emergence of more collaborative rural-urban interactions (Nieto-Romero et al. 2019; Haller et al. 2021; Šmid Hribar et al. 2023). Participating in collective decision-making and actively collaborating in commoning was found to have the potential to increase social capital in the community, enhancing local social cohesion and interpersonal cooperation, more positive identities, and sense of place (Haller et al. 2021; Šmid Hribar et al. 2023) and allowing for the expression of more intimate humans-to-nature bonds (Nieto-Romero et al. 2019). This social and non-material benefits of commoning may involve traditional owners, users and uses, but also newcomers and non-local beneficiaries (Šmid Hribar et al. 2023). When traditional commons incorporate these (or other) newer elements the concept of transforming commons is being applied (Šmid Hribar et al. 2023). On the other hand, failure in community-based common lands management may represent a lost opportunity or even a perturbing factor for local development, if conflicts and dysregulation go together with poorly managed or abandoned landscapes, configuring increased natural and socioeconomic risks for territories, as it seems to be the case in several Iberian rural areas (Lopes et al. 2015; Soto 2017).

1.2 Traditional common lands in Portugal: from resistance to transformative change?

The Portuguese common lands, *baldios*, are located mostly in the country's north and center highlands, and are estimated around 400,000 hectares, representing 18% of the country total surface (Lopes et al. 2013). Mountinous communal forestry and pasturelands in Portugal represent a typical example of historical commons which preserved their traditional character until the first decades of the 20th century. Portuguese common lands have survived till the present under constant pressures for private appropriation or government interference through public ownership or direct management (Baptista 2014; Lopes et al. 2015; Luz 2017; Skulska et al. 2020).

The likelihood of successful commons management by local communities was found to increase in contexts characterized by a minimal recognition of local community rights from higher levels of governance, and by a nested governance system, with cooperation between different governance levels (Ostrom 2010). It is important to highlight that these conditions were not observed during a long historical period in Portugal and Spain, and mainly during the dictatorships of Salazar (1928–1974) and Franco (1936–1975). This was a particularly hard time for local communities, with disrespect for local people and community rights coinciding with a significant expansion of the state's financial and technical capacity. Between 1938–1968, 80% of existing common lands were appropriated by the Portuguese State to implement an extensive Afforestation Plan (Lopes et al. 2015; Skulska et al. 2020). This drastically reduced the pasture and shrubland areas available for traditional communitarian uses and produced severe disruptions in local communities' economies (Pereira et al. 2005; Baptista 2014).

The legal recognition of communal land ownership and management rights was recovered during the transition to democracy, in 1976 (Baptista 2014; Lopes et al. 2015; Skulska et al. 2020). At this time, some of the previous rights remained more limited than before, with Forestry and Nature Conservation authorities maintaining co-responsibility in direct management, including the right to a share of financial returns from wood sales (Skulska et al. 2020). On the other hand, by then, rural communities had already started to move away from previous demographic levels, traditional values, and economic structures (Baptista 2014; Lopes et al. 2013; Luz 2017; Soto 2017).

As Elinor Ostrom sustained, local communities are in many cases able to define and to agree on a set of rules that meet local needs, in a way perceived as fair and reasonable by local users, while ensuring natural resources system use and maintenance is effective and sustainable (Ostrom 1990; Ostrom, 2010). This seems to have been the case of historical common lands in Portugal, when local communities' livelihoods where heavily dependent on local natural resources, combining small plots of private farmland with large extensions of collectively used common lands (Lopes et al. 2013; Baptista 2014). More controversial is the interpretation of current situation, after a long period of dispossession, combined with rural decline. Many contemporary Portuguese common lands seem to be in a situation where local governance does not always fit Elinor Ostrom's design principles, facing inadequate institutional and regulation settings, with local communities unable to actively manage landscape in sustainable ways (Lopes et al. 2013; Baptista 2014). In other cases, communities reassumed collective and local management activities, privileging traditional productive uses, like forestry and livestock production, or combining it with new sources of income, mainly rents linked to non-local investments in windfarms or communications projects, with financial

gains applied in social local projects (Baptista 2014; Luz 2017). Finally, some transforming commons seem to be emerging, with communities and commoner organizations finding ways to improve the integration between traditional uses with environmental and nature conservation goals, as well as with explicit community-building goals in common lands management (Soto 2017; Nieto-Romero et al. 2019).

Historical and place-specific conditions may help to explain current diversity of situations in Portuguese common lands. Considering the local, regional, and even national relevance of common lands for territorial cohesion and for sustainable landscape management, more research and case studies are needed.

2 Methods

Increasing and updating knowledge about how local communities perceive and make decisions concerning common lands use and maintenance is, thus, an important step to adapt governance systems and to expand social, economic and environmental benefits obtained from common lands for both local and non-local people. This was the purpose of the study we developed in the Alto Minho region, and the reason to privilege and in-depth village level study in a mountain community.

The methodological approach includes a brief regional contextualization and the explanation of the criteria applied to select the local case study. Alto Minho is a NUTS level 3 region, comprising 10 municipalities, each subdivided into smaller administrative units – parishes or, more recently, parishes unions – corresponding to local communities. Our case study was developed in the Sistelo parish, located in an interior and mountainous municipality (Figure 1).

2.1 Study area

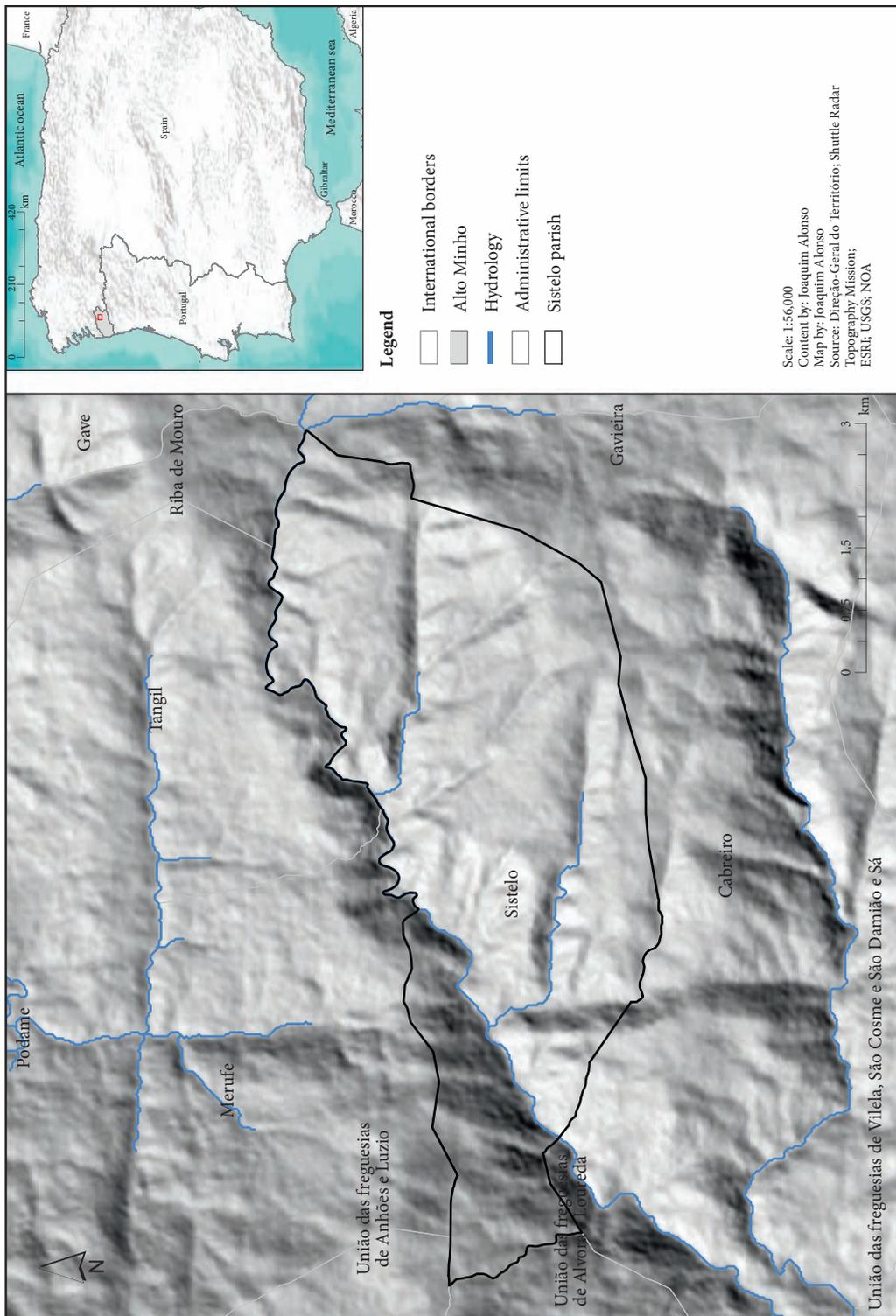
Alto Minho's demography is characterized by relatively high historical population densities, even in rural areas, and a late transition to low fertility patterns (Bandeira 1996). These features, combined with return migration, help to explain why regional mountain villages have kept, till the present day, some social and economic vitality, as well as a traditional character. By the data provided by Statistics Portugal (*Instituto Nacional de Estatística*) the region reached a demographic peak in 1950, with almost 280,000 inhabitants (126 inhabitants/km²) with subsequent population decline to current 231,500 individuals and 104 inhabitants/km². Demographic decline was spatially uneven, severe in the mountainous municipalities, with coastal and urban ones witnessing smaller losses or even growth (Figure 2).

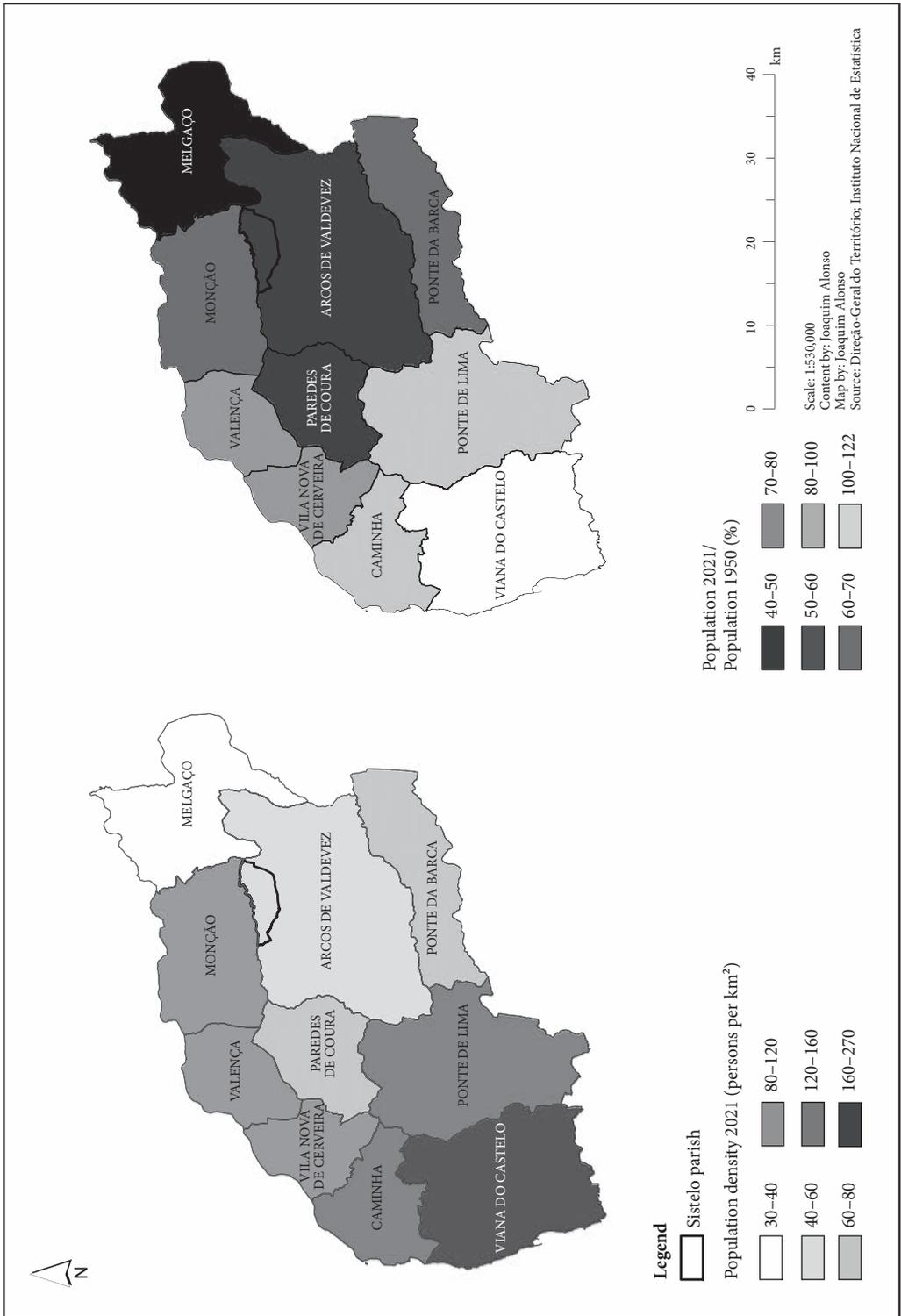
Communal owned lands are particularly important in the region. It is difficult to obtain accurate data on existing common lands number and areas. The agricultural censuses are an interesting source, as they include parish level information and capture all commons having agricultural use at the time. In 2019 a total of 159 common land units *baldios* were surveyed in the Alto Minho. This means 76% of regional parishes have at least one communal area, occupying 77,997 hectares of land, from which 46,114 hectares are classified as pasturelands. By the Statistics Portugal communally owned lands represent 35% of total regional surface and 65% of total utilized farmland, and an agricultural average size of 290 hectares, contrasting with 2,1 hectares in privately owned farm holdings. In this region, common lands have a huge relevance for sustainable landscape management and mountainous areas development.

Sistelo is a parish with a unique landscape, located in the Peneda Mountain Range, with altitudes ranging from 180 m to 1360 m (Pereira et al. 2005). By the Statistics Portugal population was around 800 individuals during the 19th Century and until 1960, when it began a steady decrease, reaching 199 inhabitants in 2021, from which 58% have 65 years old or more. By the Statistics Portugal from the parish total surface of 2,623 hectares, the common land represents 85%. Previous research in the same village, dating from 2003, evidenced a local economy still dominated by traditional farming and extensive livestock production activities, with local living standards heavily dependent on external sources of income, mainly pensions, emigrant remittances and agricultural subsidies (Pereira et al. 2005). Declining and aging population and agricultural abandonment were pointed as the main causes for rather pessimistic local people's

Figure 1: Sistelo parish and Alto Minho location. ► p. 57

Figure 2: Population density (2021) and population in 2021 compared to 1950 (%) at municipal level (Alto Minho region, NW Portugal). ► p. 58





perceptions about the future, stated by the expression »Sistelo is dead« (Pereira et al. 2005). Both farmland and common land ES were perceived by local community as decreasing, mainly due to abandonment (Pereira et al. 2005). The study identified the community as having a strong focus on the landscape and agroecosystem provisioning services, with little attention or value associated with regulating or cultural services (Pereira et al. 2005).

The village has recently seen an important part of its landscape classified as a national monument (Sistelo's Cultural Landscape, Decree-Law 4/2018). The whole area has high natural value, bordering the Peneda-Gerês National Park and being part of Natura 2000 Network and UNESCO Biosphere Reserve. Our study field work was performed in 2019, coinciding with a touristic boom in the village. The objective was to perform a participatory diagnosis in the village, unraveling local people perceptions around current challenges and opportunities, considering the on-going transition into a more open and multifunctional village. At the same time, we wanted to assess current levels of local community engagement and participation in planning and decision-making concerning development strategies and landscape management. It was particularly interesting to get a holistic perspective on how the community interacts with the common land, and how this traditional common land management is evolving (or not) to adapt to new conditions and goals.

2.2 Data collection

An exploratory phase comprised semi-structured interviews to local representatives, sectoral organization professionals and local association leaders to get more accurate insights around the main stakeholders involved and the relevant themes and questions implying decisions or solutions. After that we organized four thematic focus-groups (FG) with the following thematic areas: Living and working in a mountain village (FG1), Agro-silvo-pastoral activities (FG2), Forestry and biodiversity (FG3), and Tourism (FG4). For the first FG all local inhabitants were invited, and an effort was made to reach different age, gender, professional and socioeconomic profiles. Participants in the FG2 to FG4 were invited accordingly to their involvement in the respective activity. In total there were 30 local inhabitants involved in the FG. The sessions were audio recorded, with previous permission request, and transcribed for content analysis.

Qualitative data from interviews and FG was complemented with quantitative data obtained through a household survey ($n = 48$; 50% of total households). The questionnaire included questions on people's perceptions and attitudes about local development recent dynamics, including demographic trends, quality of life, opportunities for young people and the challenges related to on-going touristic growth. A second set of questions aimed to characterize current practices, perceptions and attitudes around land use. A specific set of questions focused the common land, how it is used by the family, and to collect data on perceptions and attitudes concerning the common land management and use at the community level.

3 Results

Sistelo is a village where we can still find very traditional land uses and ways of life side-by-side with modern lifestyles and technologies. The village community is almost exclusively composed of people with ancient family roots in the local area. Social and family networks are significantly wider, with emigration, and more recently daily commuting, being a part of life strategies of most residents. Village depopulation is a major concern for local community, with recent tourism growth considered as critical to sustain economic activity and population. Nevertheless, in the first FG it became clear local inhabitants are aware of the risks of poor development planning. As a young girl stated: »We need to have things that attract people, but without spoiling. I think this is the main thing, without spoiling what we have: the landscape, the essence« (FG1; age 20).

Farmers have been the main landscape architects and managers, as well as the main users of the common. Small arable terraces around the houses are still used to produce food (potatoes and legumes), but an increasing share of this arable land produces maize, grass and hay, as forage (Figure 3). The agroecosystem is highly dependent on seminatural vegetation in common land pastures and shrubland, where livestock (mainly bovines) stay most of the time (Figure 4). Forested areas are also present (Figure 5), mainly in intermediate altitudes.

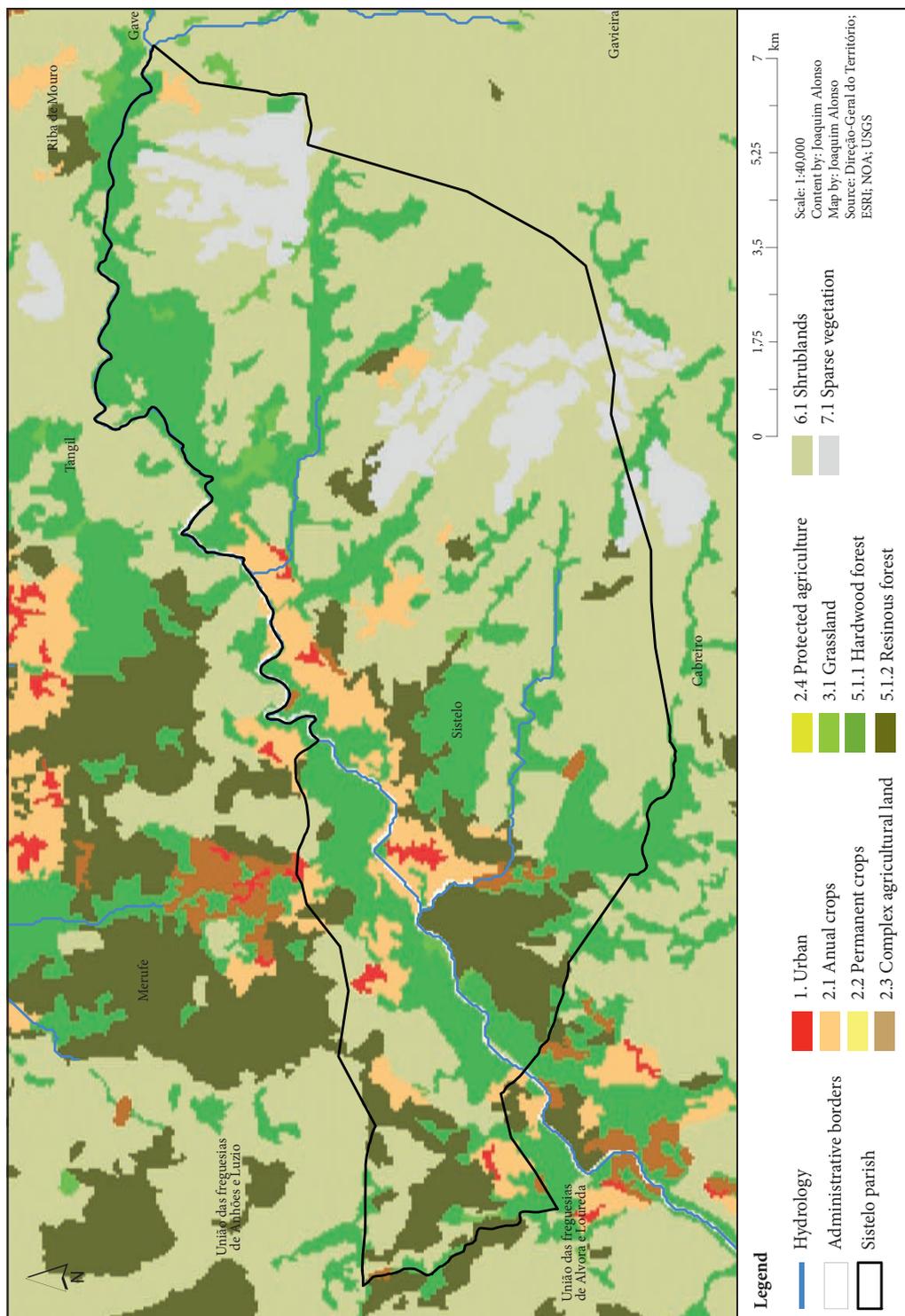


Figure 3: Terraced fields – Sistelo village.



Figure 4: Sistelo's common land pastures with Cachena cattle.

Figure 5: Land cover and use of study area 2018. ► p. 61



3.1 Common land history and current management institutions

The common land history and current management institutions were intensely commented and transversal to the four FG. Compulsory and authoritarian state intervention history is still very present in people's minds. They keep distinguishing clearly the »*monte*« (the areas continuously used by the community, which include pasturelands and oak woods) from »the forest« (areas submitted to state afforestation, mainly with conifers). Memories from this time include the sense of being under scrutiny from forest rangers, and disproportionate penalties in case non-compliance with the rules. The devolution of the common to the community is reminded as a joyful occasion: »The 'forest' has ended, and it was a joy, because we could go everywhere with the animals, and it was pleasant to go to the higher places, and to stay there« (commoner 1, age 68).

Currently, the *balديو* is managed by a directive board, elected by the commoner's assembly, in association with the National Forestry and Nature Conservation Institute (ICNF), the latter having a more relevant intervention in forested areas. Strategic decisions, new projects and non-local commoners' admissions are dependent on the Assembly approval. It is important to state all adult local inhabitants are legally entitled as commoners (*compartes*). After the community-based management was re-established, rules and monitoring did not disappear, but their legitimacy and purpose acquired a quite different perception »It were rules to induce respect, not impositions. People respected the *balديو*. We went to gather shrubs (for cattle bedding), firewood and went with the animals. The common gave us as much as the fields because animals where there most of the time« (commoner 1).

Regarding common land governance, survey results showed a large majority of village inhabitants (76%) considers every neighbor is entitled to participate in the common's management, even if it does not have cattle. Even more interesting was to verify 83% of residents considered all neighbors as co-responsible for the common maintenance. Nonetheless 89% declares cattle owners, being the major users, should contribute more. When asked if commoners assembly is highly attended, 44% household representatives were not able to respond and, from those who did, a majority of 59% disagreed with this statement. Finally, 48% respondents did not agree with the statement that all commoners are aware of the rules for using the common land, 33% did not now, and only 19% agreed with this. It seems clear that formally and culturally a large majority of local inhabitants consider themselves as commoners, and believe the common land as being a collective heritage. Nevertheless, effective engagement in the common land management is strongly connected with livestock ownership.

As a final note, it is important to mention local autonomy regarding the common land management is relative, even outside forested areas, as many actions require positive opinion from national or local authorities, under to nature conservation or landscape planning regulations. Bureaucratic procedures are seen as an obstacle by the directive board: »... we cannot touch in the common to move a rock, or to improve a pathway, we must ask for permission to the municipality, to the ICNF and now to this new one ... (cultural heritage authority)« (commoner 4; age 60). There are other controversial issues between local community and higher-level governance levels, including the traditional fire use by shepherds and the wolf protection measures. When these are introduced in the debates they bring about more emotional discourses, revealing the persistence of unsolved tensions between local community and administration authorities.

3.2 Common land uses and benefits: present and future

By the late 1970's, common land devolution to local community was clearly linked to the possibility and intents to return to traditional uses and rules. Since then, farming activity has decreased significantly, and many families became less dependent on the common land for both productive and reproductive uses. Based on the village survey data, the proportion of families regularly using the common in 2019 was around 58%. The main use was for cattle grazing (75% of users), followed by shrubs collecting (71%) and firewood collecting (43%). Less expressive were the leisure related uses, including hunting (30%) and walking (30%).

Former results suggest dominant common land uses are still very traditional. This needs to be framed in wider agricultural recent trends. After decades of decline, the village cattle total heads have been increasing, with significant growth in average herd size. The proportion of producers with less than 20 animals has dropped from around 90% in 1998 (Santos 2000) to 60% in 2019 (household survey). There is a small number of cattle breeders standing out for the larger size of the herd, a high degree of specialization and

for becoming the main users of the parish's agricultural and agroforestry areas. This is directly related to Common Agriculture Policy (CAP) measures supporting autochthonous breeds, extensive animal production and the maintenance of farming in mountainous areas. Local farmers depend heavily on the common land for pasture but also for being eligible for CAP subsidies. From the resident's perception subsidies are a major support for local economy: »Without the subsidies these villages would disappear« (commoners 2, 3, ages 54 and 59).

When asked about future common land uses there is a strong consensus about the need to maintain the traditional agricultural and forestry uses (100% agreement). But it is also interesting to notice that 97% of respondents also agreed that leisure, educational and touristic activities should also be encouraged. This multifunctionality is still emerging. Recent local tourism attractivity is encouraging new business and investments, most of them involving local families. For those who invest or are employed in tourism, it seems to be clear farmers play a central role in the landscape scenic value: »The main attractions for tourists are the *socalcos* (terraced arable plots) and the forests and pasturelands. If this landscape is not preserved, tourism will end« (FG4; restaurant owner, age 47).

There is a perception, by some members of the community, that fewer people (cattle owners) are absorbing a bigger share of the common land benefits: »They took over the common land, and took over the properties that we have abandoned, and then they have the animals. Otherwise, they wouldn't be able to keep them.« (FG3; retired, age 67); »Only half a dozen people benefit from the *baldio*, not all...« (FG3; commoner 6; age 60). Tourism does not seem to have any positive impact in the common land financial situation: »Those people who come to the *baldio* should pay a fee, so that we can have some money for repairs or other things. There's a company that comes, takes the money, and doesn't leave a dime here« (commoner 4, age 60). It is worth mentioning the common land has no fences or walls, and any other informative support aiming to raise outsiders' awareness about the existence and the common land limits, being considered by many as open access or publicly owned land.

Even if ES were not explicitly mentioned as such in the FG and the survey, local economy benefits from the common land provisioning and cultural ES and this is well known by local inhabitants. Less clear

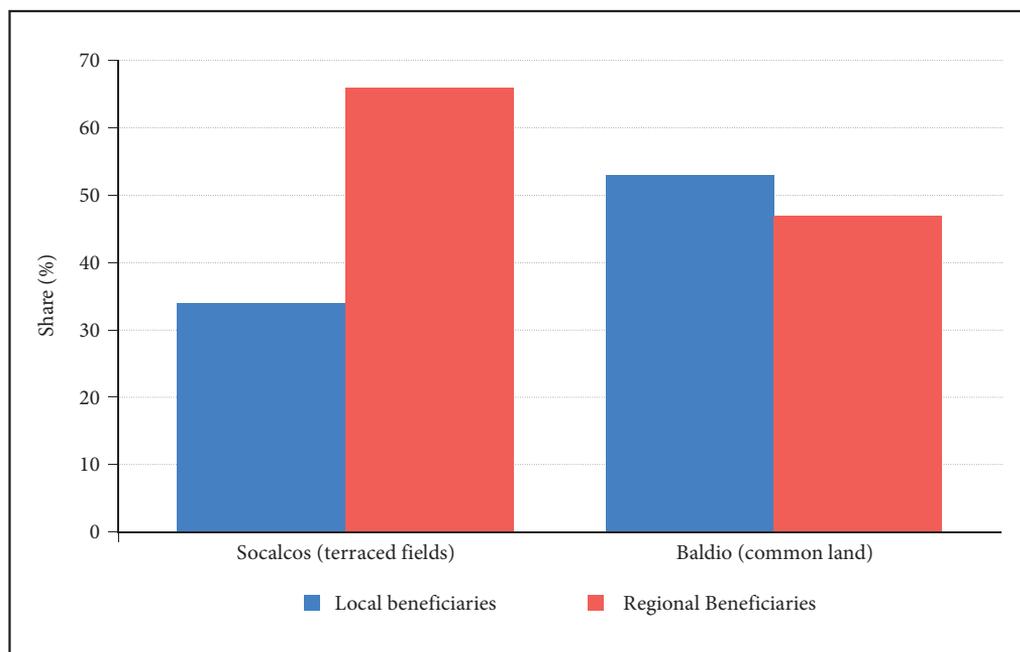


Figure 6: Perceptions about who benefits most (local or regional beneficiaries) from continued agricultural use in the *Socalcos* and from continued pastoral use in the *Baldio*; (household survey).

is how local community perceives the relevance regulating services, and how these depend on the maintenance of farming and pastoral activities. In the household survey a question was included asking who benefited more from continued agricultural use of (1) the *socalcos* (terraced fields) and (2) common land (Figure 6). The continuity of privately owned farmland cultivation is clearly associated by the respondents as having a wide range of beneficiaries, as implied in the prevalence of regional beneficiaries (66% of respondents). On the other hand, the continuity of pastoral activities in the common land is considered to benefit local stakeholders mainly, including cattle owners and common land surrounding areas owners. Even if 47% respondents believe pastoral activities in the *balديو* may generate regional wide benefits, it is worth remembering the common land area occupies 85% of total parish surface.

The common land management and use are still strongly attached to customary rules and uses. It is managed as a collective resource, ensuring that individualistic uses by the residents, mainly animal producers, comply with rules aiming to preserve the resources and fairness amongst commoners. The interdependencies between farming, tourism and nature conservation issues are being subject to intense debate, mainly around how costs and benefits are distributed amongst different community groups. Community building goals are less mentioned. Community solidarity ties are valued but also perceived as weaker than before: »I think people lived better before, there was more ... community, which we do not have now, people are getting away from each other« (local female resident, age 49). Another significant change relates local knowledge about nature, with 75% survey respondents stating younger generations have less knowledge about the nature around them than the older ones.

4 Discussion

This study allowed us to get a wider understanding of current challenges and opportunities faced by a local community regarding the common land management. As stated before, sustainable development of these lands may have serious repercussions for the future of rural areas of Northern and Central Portugal (Skulska et al. 2020). Our village level case-study revealed a local community anchored in a peasant culture and economy, where people acknowledge the common land as an important resource system, mainly for agricultural and pastoral activities, as well as a collective heritage. In this sense it configures a traditional common, as defined by Šmid Hribar et al. (2023).

Former authoritarian state intrusion is quite present in the community's memory as a negative period, which left some persistent effects, consistent with other findings of the relevance of path dependency type effects (Soto 2017; Šmid Hribar et al. 2018). It is not surprising if contemporary local communities have low trust levels in governmental institutions, even if they have been democratic for several decades now. Moreover, the same effect seems to be relevant to explain the Portuguese public institutions low readiness (or willingness) to give rise to local communities' empowerment regarding their commons (Lopes et al. 2013; Baptista 2014). It has also been stated that recent agricultural and natural conservation policies, already under the European Union context, tend to follow the same pattern of privileging command and control instruments, giving little scope for rural communities to participate in decision making (Luz 2017; Skulska et al. 2020). Previous uses and customary rules were reintroduced as soon as the post-revolutionary democratic regime allowed it, but less clear are the lasting effects of this historical phase in the community's ability to adapt to a changing economy and society. Multifunctional landscape management, including forestry, pastoralism, nature conservation, recreation and tourism activities and goals, is a challenging task. The relative absence of innovation in the Sistelo community common land use and management institutions is clearly associated with local people's decreasing knowledge and involvement in daily or strategic decisions related to it. Considering local economy and social expectations have changed significantly, and will continue to change, this inertia may constitute a factor of vulnerability.

It must be emphasized the community is rapidly changing, with economic changes involving the farming activity (fewer farmers, with bigger cattle herds) and the expansion of tourism related businesses and activities. Similar trends were found by other researchers in Portugal and Spain (Baptista 2014; Luz 2017; Soto 2017; Nieto-Romero et al. 2019; Skulska et al. 2020). There is a perception of increasing inequity in the commons-based benefits distribution, as well as a progressive disconnection between non farmers groups and the common-land. As Barnaud and Couix (2020) stated, increasing multifunctionality of mountain landscapes and of mountain farming implies a diversification of stakeholders in the local arena, as well as

the need to actively address negotiations to conciliate diversified interests and to build synergies. Non-individualistic motivations to engage in the common land management and use, as found in other common lands in Portugal and Spain (Soto 2017; Nieto-Romero et al. 2019) or in transforming commons in Slovenia and Japan (Šmid Hribar et al. 2023) did not emerge in our case study. As a matter of fact, our findings suggest a trend of progressive loss of community sense and the diminishing connection between younger people and their natural surroundings. Nevertheless, strong local support to the idea of promoting educational activities in the common land, as well as the consensus around the commons management as a collective responsibility and heritage, should be recognized as favourable conditions to improve community-based management, in line with Elinor Ostrom's theory. A participatory redefinition of rules may be needed, to ensure new social and economic conditions are reflected in the local governance system (Ostrom et al 2012).

A final remark regarding the younger generation, which has mentioned the loss of community identity and solidarity as having negative impacts in individual and social well-being. When other community-building institutions tend to disappear (local school, church attendance) the common land acquires a new significance as the main collective action arena, including non-users, and linking people to each other and to the landscape. Redefining the common-land management to explicitly incorporate community-building goals between farmers and non-farmers and between older and younger generations, may be a needed step to enter the new level of *commoning*, as suggested by Nieto-Romero et al. (2019). As Skulska et al. (2020) stated Portuguese public forestry and nature conservation authorities, which are still serving more as an enforcement agency than as facilitators of community-based management institutions could have a more relevant and positive role in this transition.

5 Conclusion

Portuguese common lands (*baldios*) are traditional commons which have resisted a long-term conflictive history with government authorities. Legal and political reestablishment of communal rights was very important for community's empowerment, even if path-dependency effects still influence community relations with non-local institutions. In some traditional villages, like Sistelo, local farmers were able to ensure the continuity of complex agroecosystems with large areas of communally owned pasturelands. Financial CAP support had significant effect in this survival. Recent classification of Sistelo's village landscape as nationally relevant cultural heritage and increased touristic attraction represent both a recognition of value, as an opportunity for further economic diversification. In other contexts, it may have happened otherwise, with severe rural depopulation and/or agricultural abandonment leading to the disappearance of the common's traditional management institutions, rules and uses, along with undesirable and well-documented ES losses.

Common land management is not, however, only relevant for farmers and for pastoral use, as our case-study has confirmed. Even more traditional communities are witnessing increased cultural pluralism and economic diversification, as well as intensified interactions with other stakeholders and with wider society. Innovative managing practices and improved rules systems may be necessary to adapt communal land management to these changing conditions. Emerging new perspectives on common lands, including explicit community-building goals, expanding non-individualistic benefits for the community, as well as deeper persons-to-nature interactions, may be leading the way. Communities and commons are diversified, and this diversity suggests the need for further research at local and regional levels. It seems wise to say communities and common's local managers may learn from each other, while preserving their autonomy and specificities. Regional governance actors are well placed to facilitate the creation of collaborative communities' networks as a tool for commons management skills improvement. Both suggestions are in line with Elinor Ostrom's ideas, namely that, by the end of the day, learning capacity and trust are vital for resilience and success.

6 References

- Agnoletti, M. 2014: Rural landscape, nature conservation and culture: Some notes on research trends and management approaches from a (southern) European perspective. *Landscape and Urban Planning* 126. DOI: <https://doi.org/10.1016/j.landurbplan.2014.02.012>
- Baptista, F. O. 2014: *Os Baldios – Autonomia e desenvolvimento local*. Lisboa.
- Bandeira, M. L., 1996: *Demografia e Modernidade – Família e Tradição Demográfica em Portugal*. Lisboa.
- Barnaud, C., Couix, N. 2020: The multifunctionality of mountain farming: Social constructions and local negotiations behind an apparent consensus. *Journal of Rural Studies* 73. DOI: <https://doi.org/10.1016/j.jrurstud.2019.11.012>
- Brouwer, R. 1995: Baldios and common property resource management in Portugal. *Unasylva* (FAO) 180-46.
- De Moor, T. 2011: From common pastures to global commons: a historical perspective on interdisciplinary approaches to commons. *Natures Sciences Sociétés* 19. DOI: <https://doi.org/10.1051/nss/2011133>
- Gløersen, E., Price, M., Aalbu, H., Stucki, E., Roque, O., Schuler, M., Perlik, M. 2004: Mountain Areas in Europe: Analysis of mountain areas in EU member states, acceding and other European countries. Nordregio Report 2004: 1, Report to the Directorate-General for Regional Development, European Commission. Stockholm
- Haller, T., Liechti, K., Stuber, M., Viallon, F.-X., Wunderli, R. (eds) 2021: *Balancing the Commons in Switzerland: Institutional Transformations and Sustainable Innovations*. London. DOI: <https://doi.org/10.4324/9781003043263>
- Honrado, J. P., Lomba, A., Alves, P., Aguiar, C., Monteiro-Henriques, T., Cerqueira, Y., Monteiro, P., Barreto Caldas, F. 2017: Conservation management of EU priority habitats after collapse of traditional pastoralism: Navigating socioecological transitions in mountain rangeland. *Rural Sociology* 82-1. DOI: <https://doi.org/10.1111/ruo.12111>
- Korner, C., Ohsawa, M. 2005: *Mountain Systems. Ecosystems and Human Well-Being: Current State and Trends*. Washington.
- Lopes, L. F. G., dos Santos Bento, J. M. R., Cristovão, A. F. A. C., Baptista, F. O. 2013: Institutionalization of common land property in Portugal: Tragic trends between »Commons« and »Anticommons«. *Land Use Policy* 35. DOI: <https://doi.org/10.1016/j.landusepol.2013.05.007>
- Lopes, L. F. G., dos Santos Bento, J. M. R., Arede Correia Cristovão, A. F., Baptista, F. O. 2015: Exploring the effect of land use on ecosystem services: The distributive issues. *Land Use Policy* 45. DOI: <https://doi.org/10.1016/j.landusepol.2014.12.008>
- Luz, A. L. 2017: Entre subsídios e turismo: Instituições e poder na gestão dos Baldios do Parque Nacional da Peneda-Gerês. *Finisterra* 52. DOI: <https://doi.org/10.18055/finis9824>
- Madureira, L., Magalhães, P., Silva, P., Marinho, C., Oliveira, R. 2013: *Economia dos serviços de ecossistema um guia para conhecer e valorizar serviços de agroecossistemas em áreas protegidas de montanha*. Lisboa.
- McKean, M., Ostrom, E. 1995: Common property regimes in the forest: just a relic from the past? *Unasylva* 46-180.
- Nieto-Romero, M., Valente, S., Figueiredo, E., Parra, C. 2019: Historical commons as sites of transformation. A critical research agenda to study human and more-than-human communities. *Geoforum* 107. DOI: <https://doi.org/10.1016/j.geoforum.2019.10.004>
- Nishi, M., Suneetha, Subramanian, M., Gupta, H., Yoshino, M., Takahashi, Y., Miwa, K., Takeda, T. 2021: Fostering transformative change for sustainability in the context of Socio-Ecological Production Landscapes and Seascapes (SEPLS). Dordrecht. DOI: <https://doi.org/https://doi.org/10.1007/978-981-33-6761-6>
- Nogueira, J., Simões, S., Araújo, J. P. 2020: Mountain agriculture and pastoralism in Northwest Portugal – transition to sustainable multifunctionality?. European structural measures for mountain farming in the context of domestic needs and expectations. Warsaw.
- O'Rourke, E., Charbonneau, M., Poinot, Y. 2016: High nature value mountain farming systems in Europe: Case studies from the Atlantic Pyrenees, France and the Kerry Uplands, Ireland. *Journal of Rural Studies* 46. DOI: <https://doi.org/10.1016/j.jrurstud.2016.05.010>
- Ostrom, E. 1990: *Governing the Commons – The evolution of institutions for collective action*. Cambridge. DOI: <https://doi.org/10.1017/CBO9780511807763>
- Ostrom, E. 2010: Beyond markets and states: Polycentric governance of complex economic systems. *American Economic Review* 100-3. DOI: <https://doi.org/10.1257/aer.100.3.641>

- Ostrom, E., Chang, C., Pennington, M., Tarko, V. 2012: The future of the commons – Beyond market failure and government regulation. Institute of Economic Affairs Monographs. Indiana University, Bloomington School of Public & Environmental Affairs Research Paper 2012-12-02. DOI: <https://doi.org/10.2139/ssrn.2267381>
- Pereira, E., Queiroz, C., Pereira, H. M., Vicente, L. 2005: Ecosystem services and human well-being: A participatory study in a mountain community in Portugal. *Ecology and Society* 10-2.
- Pinilla, V., Sáez, L. A. 2021: What do public policies teach us about rural depopulation: The case study of Spain. *European Countryside* 13-2. DOI: <https://doi.org/10.2478/euco-2021-0021>
- Ribeiro, D., Šmid Hribar, M. 2019: Assessment of land-use changes and their impacts on ecosystem services in two Slovenian rural landscapes. *Acta Geographica Slovenica* 59-2. DOI: <https://doi.org/10.3986/AGS.6636>
- Santos, J. 2000: Sistema de criação dos bovinos na Serra da Peneda. *Cadernos da Montanha -Peneda I. Arcos de Valdevez*.
- Scheurer, T., Agnoletti, M., Bürgi, M., Šmid Hribar, M., Urbanc, M. 2018: Exploring alpine landscapes as potential sites of the Globally Important Agricultural Heritage Systems (GIAHS) programme. *Mountain Research and Development* 38-2. DOI: <https://doi.org/10.1659/MRD-JOURNAL-D-18-0047>
- Serra, L., Detotto, C., Vannini, M. 2022: Public lands as a mitigator of wildfire burned area using a spatio-temporal model applied in Sardinia. *Letters in Spatial and Resource Sciences*. DOI: <https://doi.org/10.1007/s12076-022-00315-7>
- Skulska, I., Colaço, M. C., Aggarwal, S., Didier, H., Monteiro, M. L., Rego, F. C. 2020: Assessment of Portuguese community forestry using the voluntary guidelines on the responsible governance of tenure and FAO community-based forestry framework. *Society and Natural Resources* 33-1. DOI: <https://doi.org/10.1080/08941920.2019.1660934>
- Šmid Hribar, M., Kozina, J., Bole, D., Urbanc, M. 2018: Public goods, common-pool resources, and the commons: The influence of historical legacy on modern perceptions in Slovenia as a transitional society. *Urbani Izziv* 29-1. DOI: <https://doi.org/10.5379/urbani-izziv-en-2018-29-01-004>
- Šmid Hribar, M., Hori, K., Urbanc, M., Saito, O., Zorn, M. 2023: Evolution and new potentials of landscape commons: Insights from Japan and Slovenia. *Ecosystem Services* 59. DOI: <https://doi.org/10.1016/j.ecoser.2022.101499>
- Soto, D. 2017: Changing identities over commons during the process of agricultural industrialization. The case of Galician (NW Spain) since 1960. XVI Biennial IASC-Conference 'Practicing the Commons'. Utrecht.
- Torre, A., 2015: New challenges for rural areas in a fast moving environment. *European Planning Studies* 23-4. DOI: <https://doi.org/10.1080/09654313.2014.945811>

WILL FARMERS COOPERATE TO CONSERVE BIODIVERSITY? THE USE OF COLLECTIVE BONUS IN THE HIGH NATURE VALUE FARMLAND IN SLOVENIA

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Traditional agricultural landscape in Slovenia.

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Will farmers cooperate to conserve biodiversity? The use of collective bonus in the High Nature Value farmland in Slovenia

ABSTRACT: Nature conservation in farmland is often based on the wide adoption of suitable farming practices, which are effectively coordinated at the landscape level. However, more advanced policy approaches to spatial coordination often require cooperation between farmers. We use quantitative analysis of 521 surveyed farmers and qualitative thematic analysis of 123 interviews in Natura 2000 sites Haloze and Kras in Slovenia to explore farmers' preferences towards a collective bonus, which could stimulate higher adoption of grassland conservation schemes. Abandonment of farming, low interest in agri-environmental schemes and changes in social relations (individualisation of farming and distrust among actors) were identified as critical barriers to farmer cooperation in the context of agri-environmental policy.

KEY WORDS: agri-environmental measures, collective bonus, spatial coordination, collaboration among farmers, grassland conservation, Common Agricultural Policy, Slovenia

Ali bodo kmetje sodelovali na področju ohranjanja biodiverzitete? Uporaba skupinskega bonusa v kmetijski krajini visoke naravne vrednosti v Sloveniji

POVZETEK: Varstvo narave v kmetijskih ekosistemih pogosto temelji na primernih kmetijskih praksah, ki se morajo izvajati na velikih površinah in morajo biti učinkovito usklajene na krajinski ravni. Naprednejši pristopi politik k prostorskemu usklajevanju zato pogosto zahtevajo sodelovanje med kmetijskimi gospodarstvi. S kvantitativno analizo 521 anket in kvalitativno tematsko analizo 123 intervjujev na območjih Natura 2000 v Halozah in na Krasu v Sloveniji smo raziskali preference kmetovalcev do skupinskega bonusa, ki bi lahko spodbudil večje vključevanje v ukrepe za ohranjanje travnišč. Kot ključne ovire za sodelovanje med kmeti v okviru kmetijsko-okoljske politike smo prepoznali opuščanje kmetovanja, nizek interes za kmetijsko-okoljske ukrepe in spremembe družbenih odnosov, kot sta individualizacija kmetovanja in nezupanje med akterji.

KLJUČNE BESEDE: kmetijsko-okoljski ukrepi, skupinski bonus, prostorska koordinacija, sodelovanje med kmetovalci, ohranjanje travnišč, Skupna kmetijska politika, Slovenija

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1 Introduction

Voluntary agri-environmental schemes (hereinafter AES) have been established worldwide to pursue a wide range of environmental policy objectives, such as reducing erosion, protecting water resources and biodiversity conservation. Together with regulatory approaches, they remain a fundamental policy approach for tackling the negative environmental side-effects of food and fibre production (Organisation for Economic ... 2015). In the European Union, AES are implemented as part of the Common Agricultural Policy (hereinafter CAP) and probably represent the biggest source of conservation funding, often matching or exceeding national budgets for implementing biodiversity policy (Batáry et al. 2015). However, the conservation and ecological effects of AES have proved to be limited (Kleijn et al. 2006; Gamero et al. 2017; Šumrada et al. 2021a).

One of the critical drawbacks is that AES are often unable to achieve satisfactory results on the level of landscapes because the enrolment of farmers might be too low and implementation is limited to several isolated plots (Franks and Emery 2013). Furthermore, most AES are based on individual contracts with farmers and thus lack incentives for coordinating their efforts (European Network ... 2019). The landscape-level approach is critical for conserving populations of wildlife species because many require large and unfragmented areas of suitable habitat. In order to enable species' movement between such areas, agricultural landscapes also need to retain a network of well-connected ecological corridors (Donaldson et al. 2017). The latter is particularly relevant in intensively-managed farmland, where structural elements, such as landscape features, can considerably improve conditions for wildlife when implemented on scales, which correspond to different species' ecological needs (Kleijn et al. 2011).

Most farms, especially in the parts of Southern, Central and Eastern Europe, are too small to enable the ecological connectedness described above (Sutcliffe et al. 2015). Furthermore, their land can be highly fragmented and scattered around the local area due to the historical development of land policy (Jepsen et al. 2015). Both researchers and governments have thus come up with various modifications of the individual-based AES design to promote a landscape-level approach to biodiversity conservation (Šumrada and Erjavec 2020). In some cases, the managing authority can coordinate farmers' behaviour simply by providing enough information and advisory support to encourage sufficient uptake of schemes among the local farms (Franks and Emery 2013). The managing authority can also offer agglomeration or threshold (collective) bonuses to the individual payment, which incentivise farmers' efforts to achieve a common goal, e.g. sufficiently big and unfragmented patches of suitably-managed habitat (Nguyen et al. 2022). However, in many cases, the complexity of AES objectives requires the establishment of an institutional setting, which encourages collaborative management at the local level. Such a setting can involve providing support to groups of farmers who implement AES collectively via cooperatives or other types of farmer organisations. Alternatively, third-party organisations, such as conservation NGOs, can be recruited as intermediaries between farmers and policy-makers operating at the central level (Kuhfuss et al. 2019). Most of these approaches have been tested mainly in theoretical and experimental settings, whereas real-world applications remain relatively rare (European Network ... 2019; Nguyen et al. 2022). To establish an effective AES design and supporting institutions, it is thus essential to understand if and under what conditions are farmers willing to participate in coordinated or collaborative efforts for biodiversity conservation.

Research on farmers' preferences shows that they generally prefer individual agri-environmental contracts over collective commitments (Mamine et al. 2020). However, their resistance to coordinating their activities with other farmers seems surmountable if an additional (bonus) payment is offered (Kuhfuss et al. 2016). In fact, a recent review shows that such incentives exhibit high potential for increasing farmer participation, spatial coordination and environmental effectiveness in the AES (Nguyen et al. 2022). These results suggest that if farmers recognise tangible benefits through monetary incentives or reduced transaction costs, coordinated management can indeed become a viable policy approach (Reed et al. 2014).

However, the success of cooperation efforts can be determined by a number of economic, social, cultural and institutional factors. These include the availability of external support in the form of advice or funding, the level of trust between actors and shared cultural values on collective working (Kuhfuss et al. 2019). Farmers' willingness to accept the AES can also be increased by social norms, e.g. if other farmers recommend the scheme (Villamayor-Tomas, Sagebiel and Olschewski 2019) or have high adoption rates (Chen et al. 2009). Finally, long-term political support and a stable institutional setting are typically needed to establish cooperation at the local level and to enable flexible management of the scheme (Organisation for Economic ... 2013).

This research is a part of a broader study on farmers' decision-making process and preferences toward alternative designs of AES for grassland conservation in Slovenia (Šumrada et al. 2022). The study took place in two Natura 2000 sites in Haloze and Kras, which can be considered typical High Nature Value farmlands in Slovenia (European Environment Agency 2012). Specific geological, climatic and other factors in both sites contributed to the development of dry grasslands of high conservation value, which require extensive management with late mowing or grazing (Jogan et al. 2004). A targeted AES was introduced in 2009 to incentivise their conservation (Žvikart 2010). However, the uptake by farmers has been very modest (e.g. in 2019, only 12% of target grassland areas were enrolled in Haloze and 52% in Kras) and thus the scheme did not achieve its conservation objectives (Kirbiš et al. 2020). Therefore, this study aimed to determine whether a different design of AES can improve farmers' willingness to maintain extensive use of dry grasslands.

In this paper, we aim to explore farmers' preferences towards coordination incentives in the AES and what would be their most suitable design. Given the lack of experience with AES involving cooperation in Slovenia, a relatively simple economic incentive in the form of a collective bonus payment, which would be offered to farmers involved in the coordination efforts (Šumrada and Erjavec 2020), was selected as a suitable setting for our discussion with farmers. Furthermore, we explore the critical barriers to cooperation between farmers in the framework of AES.

2 Methods

2.1 Study sites

Natura 2000 sites in Haloze and Kras are located in the eastern and south-western parts of Slovenia, respectively (Figure 1). Both research areas are characterised by gradual abandonment of farming in recent decades, followed by changes in land use and overgrowing with shrubs and forests (Žiberna 2012;



Figure 1: Map of Natura 2000 sites Haloze and Kras in Slovenia, where the study took place.

Kaligarič and Ivajnsič 2014). Based on our own analysis of land use and agricultural policy data, in 2019, most of the study areas were covered by forest (Kras 61% and Haloze 56%) and a significant share was covered by agricultural land in various stages of overgrowth (Kras 14% and Haloze 9%). Permanent grassland occupied 19% of the area in Kras (11,830 ha) and 24% in Haloze (4,176 ha), whereas permanent crops (mostly vineyards and orchards) covered further 2% of Kras and 5% of Haloze. There were few arable fields in both areas (0.8% in Kras and 3% in Haloze). As such, both areas represent a typical structure of land use types in Slovenia with a relatively high coverage of forests (59% in 2019) and a predominant share of permanent grasslands among the agricultural land use types (17%). However, the share of agricultural land in various stages of overgrowth was considerably higher in both study areas than the Slovenian average (4%).

Similar to many other rural regions in the Central and Eastern Europe (Sutcliffe et al. 2015), structural changes have been relatively slow in both, Kras and Haloze. To this day, a highly fragmented land structure has been preserved and small farms predominate. In 2019, there were 1,045 farms in the Natura 2000 site Kras and 977 in the Natura 2000 sites in Haloze. More than half of the farms managed less than 5 ha of agricultural land (Kras 52% and Haloze 59%), and a quarter managed 5 to 10 ha (Kras 26% and Haloze 25%). Only 4% of farms in Kras can be considered large, since they manage more than 50 ha of agricultural land, whereas in Haloze such farms account for only 1%. This structure is similar to the overall farm size structure in Slovenia, where 59% of farms managed less than 5 ha of land, 23% from 5 to 10 ha and 17% more than 10 ha of land, according to the data on agriculture, forestry and fishery at the national Statistical Office (2020; https://pxweb.stat.si/SiStatDb/pxweb/sl/30_Okolje/). Statistical data show that in 2010, two-thirds (66%) of farms in Kras were producing predominately for their own consumption and almost three-quarters in Haloze (74%).

2.2 Data collection

Interviews with farmers took place in March and April 2019 with the help of six trained interviewers (Figure 2). The sampling population consisted of all registered farms that regularly submit applications for the CAP income support and manage at least 0.3 ha of grasslands. We focused on farmers who submit their annual CAP application in the local offices of the public agricultural advisory service in Ptuj and Slovenska Bistrica

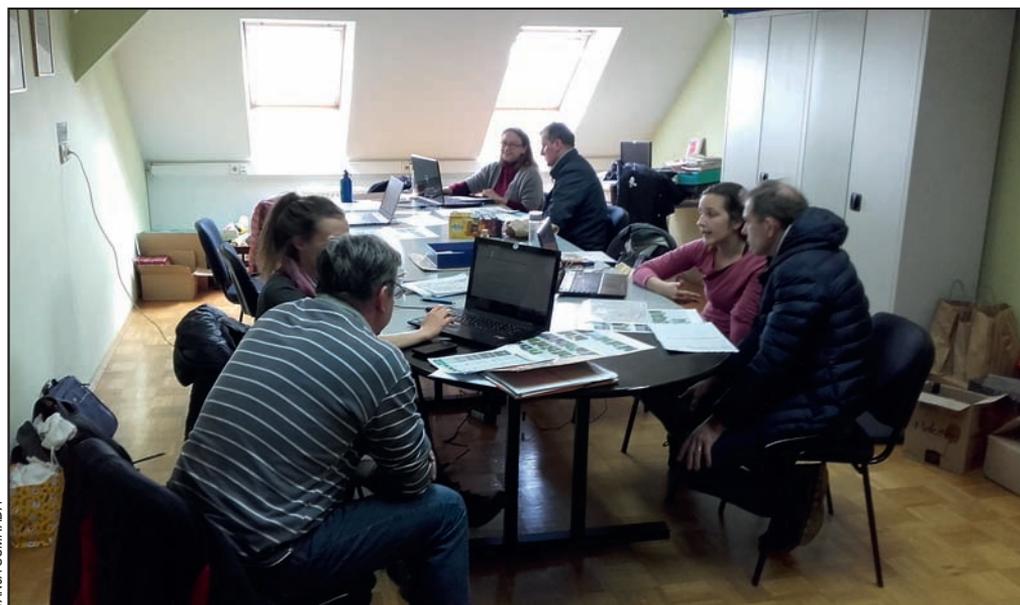


Figure 2: Face-to-face interviews with farmers during the data collection in the study areas.

(Haloze), and in Sežana (Kras). There were approximately 680 such farms in Haloze and 650 in Kras. All farmers, who met the above criteria, were invited to participate in a face-to-face interview. A total of 258 interviews (38%) were conducted in Haloze and 263 (41%) in Kras (Table 1).

Interviews followed a structured questionnaire, which consisted of three parts: (1) knowledge of and experience with agricultural policy measures and attitudes towards grassland conservation; (2) preferences regarding possible AES designs; (3) demographics and characteristics of the farm. During the interviews, we expanded the questionnaire with additional questions whenever possible. This provided us with in-depth answers and explanations from farmers, which were then the subject of qualitative analysis. Before the interview, we asked each farmer for permission to record the conversation, to which 347 farmers agreed (159 in Haloze and 188 in Kras). Before the data collection, we tested the questionnaire by surveying 22 farmers in both research areas.

2.3 Quantitative data analyses

The study of farmers' preferences towards coordination incentives was centred around two research objectives. In the quantitative analyses, we focused on farmers' preferences towards the bonus type. The collective bonus was defined as an additional (top-up) payment to each participating farmer if a targeted extent of grassland area is enrolled in the scheme in the particular Natura 2000 site. After presenting the concept of a collective bonus to farmers, we inquired what would be the most suitable conditions for the bonus activation. We offered two options that theoretically require different levels of direct communication between farmers: (1) a bonus, which would be paid to farmers when the target area is reached at the level of the whole Natura 2000 site (hereafter »Natura 2000« bonus), and (2) a bonus, which would be awarded to farms on a local level (e.g. in a couple of neighbouring villages) when a corresponding share of the Natura 2000 site target area would be reached. We aligned the target area for the »Natura 2000« bonus payment with conservation objectives determined for each site in the Natura 2000 management programme 2015–2020, i.e. 1,097 ha for Haloze (26% of registered permanent grasslands) and 2,280 ha (24%) for Kras (Vlada Republike Slovenije 2015). To determine the influence of the farmers' views on the feasibility of the »Natura 2000« bonus, we provided farmers with a visual presentation of the Natura 2000 site and asked them how likely the target would be reached in the study area.

Quantitative data analyses of farmers preferences towards different types of collective bonus and its feasibility, as well as the potential influence of different socio-economic factors were performed in the STATA (StataCorp, version 16.1). The homogeneity of the nominal variables was checked with the chi-square test to compare the samples between the two study areas, previous experience with AEM and farm characteristics. We used one-way analysis of variance (ANOVA) and the Bonferroni test to verify the averages of the numerical variables, describing the socio-economic factors and farm characteristics. The Kruskal-Wallis test was used as a non-parametric alternative. The latter was also used in the case of ordinal variables (Acock 2014).

2.4 Qualitative data analyses

The second research objective focused on eliciting the critical barriers to cooperation between farmers in the agri-environmental policy setting. After listening to all the interview recordings, we selected a total of 123 interview recordings (61 from Haloze and 62 from Kras), in which farmers gave the most in-depth additional answers and were, therefore, best suited for qualitative analysis (Table 1). Interviews lasted between 22 and 90 minutes. We read or listened to the recordings several times and encoded relevant segments, where farmers discussed cooperation, social relations, agri-environmental measures and agricultural and other development trends in the region. The codes were generated inductively while reading the interviews. After several stages of reviewing, the codes in this study were then grouped into topics connected to preferences towards the bonus type and various barriers to farmer cooperation, including individualisation of farming, trust between actors, interest of farmers to enrol in the scheme, farm abandonment, and land structure and fragmentation (Braun and Clarke 2006). Qualitative analysis was conducted in Atlas.ti (Cleverbridge, version 8.4).

Table 1: Interviewed farmers and their comparison to the whole farmer population in the study sites in Haloze and Kras in 2019 (AEM – currently enrolled in the agri-environmental measure, HAB – currently enrolled in the existing scheme for grassland conservation) (adapted from Integrated administration and control system (IACS) database of Slovenia and own research data).

	Farmer population (n = 2,022)				Survey sample (n = 521)				Qualitative sub-sample (n = 123)			
	%	Mean	SD	Range	%	Mean	SD	Range	%	Mean	SD	Range
Farm size [ha]		8.8	16.28	0.5–271.7		11.7	26.59	1.0–271.7		19.0	41.90	1.5–271.7
Grasslands [ha]		6.8	15.02	0.0–271.7		9.8	22.70	0.3–270.0		16.9	38.49	0.3–270.0
Livestock or mixed farms	63.2				64.5				70.6			
Age of farm holder [yrs]		59.5	14.44	20–98		59.5	13.74	20–95		59.3	13.76	27–94
Gender - male	67.4				67.4				72.3			
AEM	16.5				29.2				30.3			
HAB	8.0				15.2				11.8			

3 Results

3.1 Farmers' preferences towards the type of bonus

About 40% of respondents opted for the »Natura 2000« bonus, whereas slightly more farmers (43%) believed it would be better if the bonus was awarded to farms on a local level (Figure 3). Farmers in Kras were statistically more likely to opt for the »Natura 2000« bonus, whereas in Haloze respondents preferred the bonus, which would be awarded locally ($\chi^2(2) = 5.99$, $p = 0.05$). No other statistically significant differences between farmers, e.g. in relation to their farms' size (ANOVA, $p = 0.779$) or production orientation ($\chi^2(6) = 7.24$, $p = 0.300$), were detected. However, farmers who chose neither of the available options were, on average, somewhat older than other respondents (ANOVA, $p < 0.05$).

The reasons for the farmers' preference toward different types of bonuses could potentially be attributed to the disbelief in the feasibility of the biodiversity policy objectives. Therefore, we asked them how likely they think will the target area be reached at the level of the Natura 2000 sites. Interestingly, farmers who thought that the target was very likely to be reached more often chose the »Natura 2000« bonus option, whereas those who were less convinced were more likely to opt for the locally-awarded bonus option ($\chi^2(4) = 17.71$, $p < 0.01$).

A fifth (21%) of the respondents thought that the target was very likely to be reached and almost half believed that it was possible (47%) (Figure 4). There were no statistically significant differences between the study areas ($\chi^2(3) = 2.04$, $p = 0.564$). We also did not detect statistical differences in terms of farmers' knowledge of agricultural policy (K – W, $p = 0.565$), previous experience with agri-environmental measures

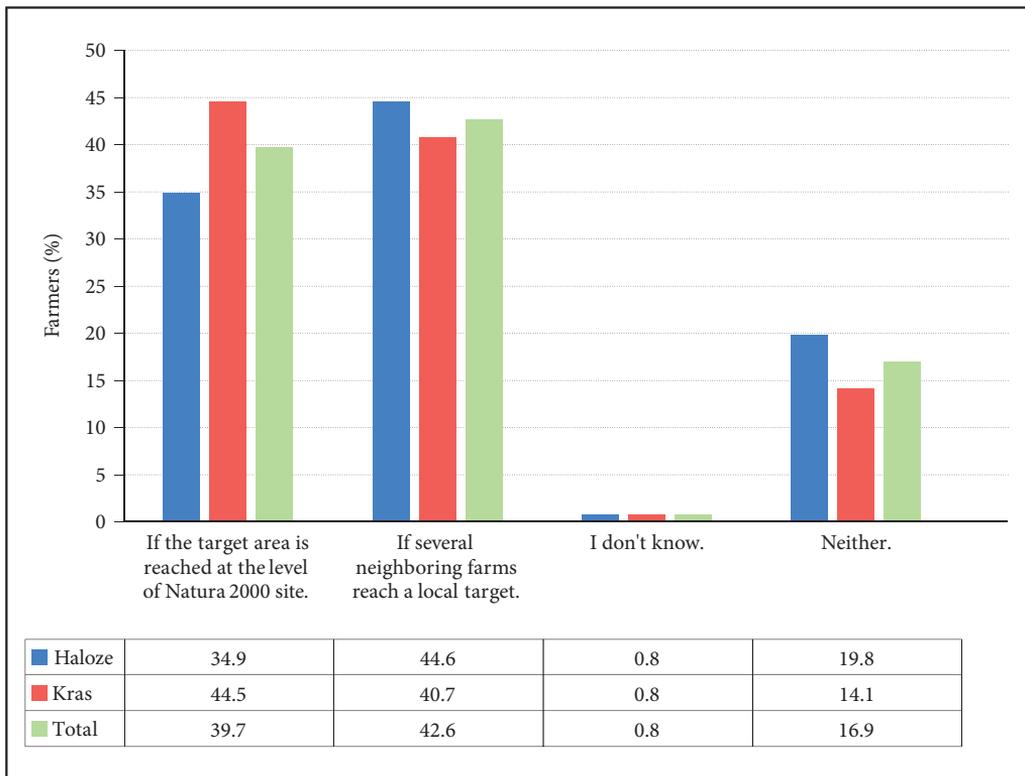


Figure 3: Possible collective bonus designs to incentivise coordination and higher participation rates in the AES (Haloze $n = 258$, Kras $n = 253$, Total $n = 521$).

($\chi^2(6) = 6.29, p = 0.392$), farm size (ANOVA, $p = 0.262$) or production orientation ($\chi^2(9) = 4.84, p = 0.848$). Older farmers were more likely to state that the realisation of the target enrolment was unlikely, while younger farmers tended to be more optimistic (ANOVA, $p < 0.001$).

3.2 Critical barriers to farmer cooperation

In farmers' opinion, the key barriers to establishing cooperation with their peers in the AES are the abandonment of farming and rural depopulation (Table 2). In the study areas, both processes might indeed considerably influence the potential for coordinating activities because farmers pointed out that they have often become relatively isolated (e.g. the only farm left in the village). Furthermore, many farmers highlighted the ageing of the farmer population in this context, which might further limit the acceptance of new policy approaches.

The bonus payment (EUR 40/ha) was estimated as too low to overcome the reasons why existing farmers do not choose to enrol in the scheme, such as decreased fodder quality due to late mowing and administrative obligations. It is thus not surprising that when farmers were asked to rank five features of the scheme's design, the collective bonus was ranked the lowest (avg = 4.22, SD = 1.069), whereas the most important features were the technological conditions for receiving individual payment (avg = 2.25, SD = 1.332), such as the mowing and grazing regime, and the amount of payment (avg = 2.44, SD = 1.170) (Figure 5). This was followed by the advisory support (avg = 3.03, SD = 1.120) and the monitoring approach (3.06 place, SD = 1.388).

However, drawbacks to cooperation between farmers can also be traced to lifestyle changes in the agricultural community, where farming is becoming increasingly individualised, and other social factors, such

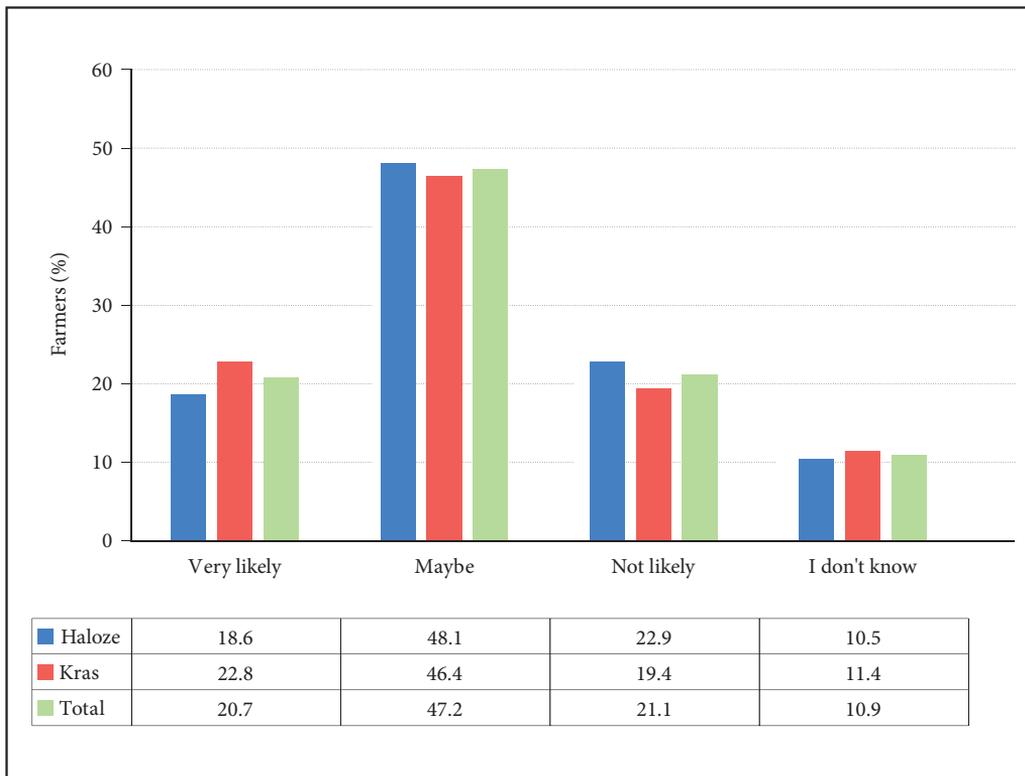


Figure 4: Farmers' assessment of the feasibility of reaching the conservation targets (i.e., extent of grasslands enrolled in the scheme) set for their Natura 2000 site in the Natura 2000 management programme (Haloze $n = 258$, Kras $n = 253$, Total $n = 521$).

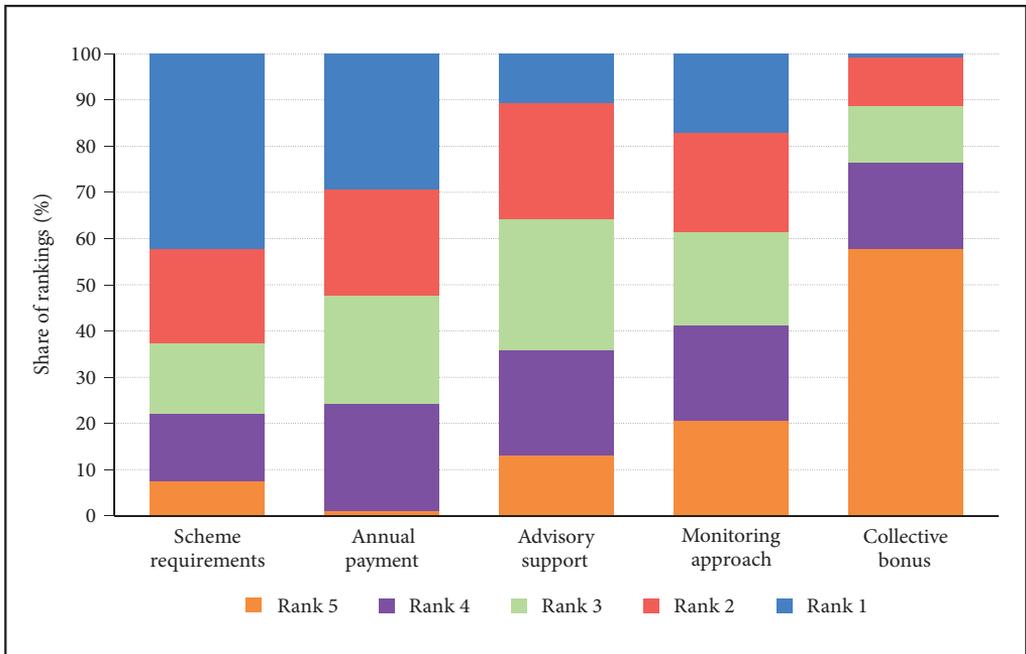


Figure 5: Share of farmers' rankings of the importance of different factors when they consider entering the AES for extensive use of grasslands (rank 1 – most important, rank 5 – least important) (n = 521).

Table 2: Barriers to cooperation between farmers in the framework of AES for extensive use of grasslands (Haloze n = 61, Kras n = 62).

Barrier to cooperation	No. of farmers	Example quotes
Farm abandonment and depopulation	37 (Haloze 14, Kras 23)	<i>In my village, for example, I have no neighbouring farm because I am the only one [left]. There's one [farm] more [in the vicinity], but whether they intend to enrol [in the AES] or not, I don't know. (Kras, interview 119)</i> <i>No one will opt for this [bonus] because there are simply no people left to do it. This is the worst thing that could happen. Even if someone wanted [to coordinate], he himself now mows [the meadows] when he has time and when there is suitable weather. /.../ When you get older, you can no longer enrol [in the AES] because you cannot oblige yourself. But there are no young people [to enrol] either. (Haloze, interview 19)</i>
Low interest in enrolling in the scheme	21 (Haloze 9, Kras 12)	<i>Everything depends on the presence of animals on the farm. Because most farms are now without animals and thus not tied to produce fodder, they can delay the mowing date a bit and [consequently] enter this measure. Now, if the feed quality is also important, then these [conditions of the scheme] are more difficult to reach. There are few animals in the Kras now. I can't estimate how many... I have no idea. But a young farmer will probably find it easier to get involved than the old one. /.../ However, I don't think they will. (Kras, interview 152)</i>
Individualisation of farming	20 (Haloze 12, Kras 8)	<i>Yeah, it would be great if [the bonus payment] could be organised locally. It would be a tremendous success. But here [in my community], there are primarily winegrowers now. There are also those who came and moved here. You see them with cattle every now and then. [But] we don't really know each other. (Kras, interview 159)</i>
Distrust among farmers	20 (Haloze 4, Kras 16)	<i>This [bonus payment] doesn't seem likely to me at all. It ties you to someone else. Farmer should be bound only to himself. /.../ You can't force someone else to work... and then someone does something wrong and we're all in it. /.../ You can only rely on yourself, not on a neighbour or someone else, because sanctions would be on everyone if one does not adhere to conditions. (Haloze, interview 22)</i>
Land fragmentation and small size of farms	9 (Haloze 2, Kras 7)	<i>It's a little specific here [in Kras], because the plots are very small and fragmented. On average, they are only one thousand square meters in size. I don't even know how many parcels I needed to obtain to somehow reach [the current size of the farm]. (Kras, interview 131)</i>

as mistrust between farmers with different production orientations and between »native« farmers and »new-comers«, who set up farms in the area in recent years (Table 2). When comparing the key barriers between the study areas, the farmers in Kras more often pointed out mistrust and the problems of farm abandonment and land fragmentation than in Haloze. By contrast, interviewees in Haloze seemed more often concerned with the individualisation of farming than in Kras (Table 2).

4 Discussion

In areas with highly fragmented farm structure and small farms struggling to respond to market pressures, farm economic resilience can be increased through cooperation, which can reduce production costs, improve market access and reduce transaction costs in obtaining agricultural policy funds (Valentinov 2007). In particular, if additional incentives are offered to reduce the transaction costs related to communication (Reed et al., 2014). However, research shows that the decision to cooperate goes beyond economic factors and is much more complex, because it is heavily influenced by social norms, the ability to develop a shared understanding and commitment, and contextual factors, such as past experience and governance structures (Ansell and Gash 2007).

Trust between the prospective collaborators has been consistently emphasised in the literature as a foundation for building cooperation among farmers (Kuhfuss et al. 2019). Trust develops by bridging conflicting perceptions of risk, which can create new opportunities for future collaboration (Slovenec and Erjavec 2021). In our study, farmers often highlighted the risk of free-riding, where incompliance with the rules of the AES by some farmers could potentially affect the whole group (Table 2). Farmers often justified their selection of the bonus, which would be awarded locally, by referring to this risk since they would have more control by working with the people they know. This shows a potential for establishing peer-based control, which is considered important for the success of the collective AES (Prager 2015).

The building of trust in the relationships typically develops over time, so past experience can significantly influence the success of cooperation attempts (Kuhfuss et al. 2019). In Slovenia, the collapse of the local agricultural cooperatives due to the loss of Yugoslav markets in the 1990s and further negative experience with attempts to re-establish them has importantly influenced farmers' perceptions. Furthermore, this negative cultural experience seems to have passed on to the next generation of young farmers as well (Slovenec and Erjavec 2021). Although some references were made to these past events, suggesting similar experiences in the study areas, farmers in our interviews rarely directly connected this legacy and to potential cooperation in the agri-environmental context. This is in line with the conclusion of Riley et al. (2018) that farmer-to-farmer relations are not universal and can differ between farming activities. However, it should be noted that a collective bonus is a relatively simple policy incentive, so the negative experience with cooperation, albeit from a different context, might still become relevant in the case of more complex policy designs, such as a collective AES (Prager 2015).

The development of agriculture in the past decades has significantly influenced farmers' decision-making in other ways as well. Dramatic technological, social and economic changes in rural areas after World War II significantly changed farmers' identities and how they cooperate. Agriculture has gradually changed from a common activity, in which all households in the village participated, to a sector where only a few (semi-)professional farmers operate. Farming has thus become an increasingly individual endeavour (Riley et al. 2018). Farmers in our study have highlighted the same process:

»In our village, the abandonment of animal husbandry and farming began [in Yugoslavia] when [the police officers] started to punish [local farmers] for leading the cattle over the newly built regional road leading to the coast. /.../ At that time, about a third [of local inhabitants] abandoned farming. The next third went out of the business when the local dairy cooperatives disbanded [after Slovenia gained independence in the early 90s]. And the last third disengaged when it was no longer allowed to slaughter the animals at home [due to the new sanitary rules enforced before Slovenia joined the EU]. Now there is only a couple of farms left in the village« (interview 65, Kras).

This quotation shows that farmers experienced the sector's transformation in the last decades as a series of important structural breaks, which have been closely connected to the abandonment of farming. In the last decades, the agricultural policy may have further promoted individualisation in agriculture, including

by establishing the agri-environmental measure, where payments are based exclusively on individual contracts (Riley et al. 2018).

Consequently, farmers in the study areas now rarely communicate with each other, especially with peers that operate mainly in other agricultural sectors (e.g. winegrowers with cattle breeders) (Table 2). Furthermore, we noted that there is sometimes a tension between »native« farmers and newcomers, who immigrated to the area and have begun farming only recently, because these farmers often have different worldviews, including in the field of environmental protection. Similar tension has been highlighted between conventional and organic farmers in another Slovenian region Goričko (Slovinc 2019), which has some similar natural and structural characteristics to agriculture in Haloze, where organic farmers are often newcomers in the local farming community. Lack of communication, particularly on topics related to agri-environmental management, and social tensions, which inhibit the establishment of shared visions and trust, have been highlighted as important factors, which could potentially inhibit farmer cooperation (Riley et al. 2018). Therefore, some farmers in our study felt that a »Natura 2000« bonus payment would make more sense, because they believed it would be nearly impossible for them to come to an agreement with their peers at the local level.

Finally, a critical mass to establish cooperation between farms might be difficult to reach in the study areas due to the abandonment of farming (Table 2). In the interviews, farmers often pointed out that they were now the only or one of the few remaining farms in their village, so they did not believe there were enough peers to communicate with. This obstacle was highlighted more often by respondents from Kras (Figure 5), which could explain the difference in preferences towards the bonus type between the two areas in the quantitative part of the survey. This difference could stem from the fact that the farm abandonment process might be more advanced in the Kras (Kaligarič and Ivajnsič 2014), but this was not possible to confirm in this study.

However, we can conclude that farm abandonment can play a significant role in the potential for collaborative agri-environmental management. This problem has been rarely highlighted in the literature, which might be connected to the fact that the existing examples of collective action in the AES come almost exclusively from Western and Central Europe (Prager 2015), where this process might have been less intensive. By contrast, it has already been established that the lack of viable farms on the local level can inhibit economic cooperation between farmers in Slovenia (Slovinc and Erjavec 2021). As farm abandonment is a complex issue, involving several other factors and trends, including employment opportunities, population density, land structure and intensity of farming (Levers et al. 2018), the AEMs can probably serve only as one of the several complementary rural and regional development policy instruments (Šumrada et al. 2021b). Due to lack of research, it is currently not clear if collective or collaborative approaches to AES can be more effective than the schemes based on individual contracts in reaching agri-environmental objectives in these areas. However, it would be worth exploring if collective AES could also indirectly stimulate overall farming activity at the local level (Prager 2015).

5 Conclusion

The implementation of the agri-environmental policy often requires coordination of action at the landscape level because it is necessary to ensure a sufficient extent of contracted land to achieve the environmental objectives (Franks and Emery 2013). The design of such incentives may range from information measures to ensure a sufficient density of individual contracts to collective action, which enables groups of farmers to submit collective plans for managing a certain area (Šumrada and Erjavec 2020).

This contribution provides one of the first insights into farmers' preferences for cooperation in the field of agri-environment in Slovenian agriculture, where low willingness to cooperate among farmers has often been highlighted (Erjavec et al. 2018). However, the reasons for this, especially in the field of obtaining agricultural policy funds, are relatively poorly researched (Slovinc and Erjavec 2021). Furthermore, there has been limited experience in incentivising cooperation in the agri-environmental policy (European Network ... 2019), although some schemes, e.g. mountain grazing, where the management has traditionally been common, do already allow enrolment of the groups of farmers (Uredba o ukrepih kmetijsko-okoljska-podnebna plačila, ekološko kmetovanje in plačila območjem z naravnimi ali drugimi posebnimi omejitvami iz Programa razvoja podeželja Republike Slovenije za obdobje 2014–2020, Uradni list RS 20/22).

Farmers in our study attributed relatively low importance to the collective bonus in their decision-making process, especially when compared with other aspects of the AES design. However, there was considerable heterogeneity in farmers' preferences regarding how the bonus should be awarded. These differences were mainly related to the optimism regarding the achievement of the conservation targets, perceived risk of free-riding, and individualisation in farm management. In both research areas, potential cooperation between farmers could also be considerably limited by the abandonment of farming, which has left only one or a few active farmers in some villages.

In the study areas and other regions with similar socio-economic contexts, spatial coordination and sufficient extent of contracted land to achieve conservation goals might thus be more feasible to achieve by working with farmers on the individual level (Franks and Emery 2013). To achieve this, third-party organisations, such as local advisory services, protected area management authorities and conservation NGOs, could be recruited to help with information-sharing and communication (Kuhfuss et al. 2019). In this sense, the introduction of the collective bonus might still be a useful incentive, because it could indirectly guide the operation of such institutions and help with the promotion of the scheme. However, other instruments, such as knowledge transfer and cooperation measures within the CAP, are probably more important and should be prioritised in pursuing this endeavour.

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7 References

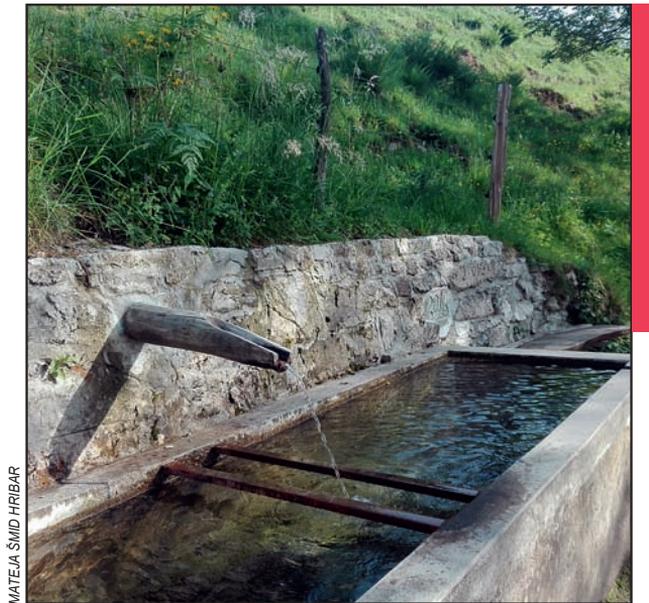
- Acock, A. C. 2014: A gentle introduction to Stata. College Station.
- Ansell, C., Gash, A. 2007: Collaborative governance in theory and practice. *Journal of Public Administration Research and Theory* 18-4. DOI: <https://doi.org/10.1093/jopart/mum032>
- Batáry, P., Dicks, L. V., Kleijn, D., Sutherland, W. J. 2015: The role of agri-environment schemes in conservation and environmental management. *Conservation Biology* 29-4. DOI: <https://doi.org/10.1111/cobi.12536>
- Braun, V., Clarke, V. 2006: Using thematic analysis in psychology. *Qualitative Research in Psychology* 32. DOI: <https://doi.org/10.1191/1478088706qp063oa>
- Chen, X., Lupi, F., He, G., Liu, J. 2009: Linking social norms to efficient conservation investment in payments for ecosystem services. *The Proceedings of the National Academy of Sciences* 106-28. DOI: <https://doi.org/10.1073/pnas.0809980106>
- Donaldson, L., Wilson, R. J., Maclean, I. M. D. 2017: Old concepts, new challenges: adapting landscape-scale conservation to the twenty-first century. *Biodiversity and Conservation* 26. DOI: <https://doi.org/10.1007/s10531-016-1257-9>
- Erjavec, E., Šumrada, T., Juvančič, L., Rac, I., Cunder, T., Bedrač, M., Lovec, M. 2018: Vrednotenje slovenske kmetijske politike v obdobju 2015-2020: Raziskovalna podpora za strateško načrtovanje po letu 2020. Ljubljana.
- European environment agency 2012: Updated high nature value farmland in Europe: An estimate of the distribution patterns on the basis of CORINE Land Cover 2006 and biodiversity data. Copenhagen.
- European network for rural development 2019: RDP analysis: Support to environment and climate change. M10.1 Agri-environment-climate commitments. Brussels. Internet: https://ec.europa.eu/enrd/sites/default/files/rdp_analysis_m10-1.pdf (8. 5. 2023).
- Franks, J. R., Emery, S. B. 2013: Incentivising collaborative conservation: Lessons from existing environmental Stewardship Scheme options. *Land Use Policy* 30-1. DOI: <https://doi.org/10.1016/j.landusepol.2012.06.005>
- Gamero, A., Brotons, L., Brunner, A., Foppen, R., Fornasari, L., Gregory, R. D., Herrando, S. et al. 2017: Tracking progress toward EU biodiversity strategy targets: EU policy effects in preserving its common farmland birds. *Conservation Letters* 10-4. DOI: <https://doi.org/10.1111/conl.12292>
- Jepsen, M. R., Kuemmerle, T., Müller, D., Erb, K., Verburg, P. H., Haberl, H., Vesterager, J. P. et al. 2015: Transitions in European land-management regimes between 1800 and 2010. *Land Use Policy* 49. DOI: <https://doi.org/10.1016/j.landusepol.2015.07.003>

- Jogan, N., Kaligarič, M., Leskovar, I., Seliškar, A., Dobravec, J. 2004: Habitatni tipi Slovenije. Tipologija. Ljubljana.
- Kaligarič, M., Ivajnsič, D. 2014: Vanishing landscape of the »classic« Karst: Changed landscape identity and projections for the future. *Landscape and Urban Planning* 132. DOI: <https://doi.org/10.1016/j.landurbplan.2014.09.004>
- Kirbiš, N., Čuš, J., Rode, J., Žogan Čokl, N., Klavž, D., Žvikart, M., Jelenko Turinek, I. et al. 2020: Analiza izvajanja ukrepov Programa upravljanja območij Natura 2000 2015-2020 za obdobje 2015-2019: Sektor kmetijstvo. Verzija 2.0. Ljubljana.
- Kleijn, D., Baquero, R. A., Clough, Y., Díaz, M., Esteban, J., Fernández, F., Gabriel, D. et al. 2006: Mixed biodiversity benefits of agri-environment schemes in five European countries: Biodiversity effects of European agri-environment schemes. *Ecology Letters* 9-3. DOI: <https://doi.org/10.1111/j.1461-0248.2005.00869.x>
- Kleijn, D., Rundlöf, M., Scheper, J., Smith, H. G., Tscharntke, T. 2011: Does conservation on farmland contribute to halting the biodiversity decline? *Trends in Ecology and Evolution* 26-9. DOI: <https://doi.org/10.1016/j.tree.2011.05.009>
- Kuhfuss, L., Begg, G., Flanigan, S., Hawes, C., Piras, S. 2019: Should agri-environmental schemes aim at coordinating farmers' pro-environmental practices? A review of the literature. *Proceedings of the 172nd EAAE Seminar 'Agricultural policy for the environment or environmental policy for agriculture?'*. Brussels. DOI: <https://doi.org/10.22004/ag.econ.289774>
- Kuhfuss, L., Préget, R., Thoyer, S., Hanley, N. 2016: Nudging farmers to enrol land into agri-environmental schemes: the role of a collective bonus. *European Review of Agricultural Economics* 43-4. DOI: <https://doi.org/10.1093/erae/jbv031>
- Levers, C., Schneider, M., Prishchepov, A. V., Estel, S., Kuemmerle, T. 2018: Spatial variation in determinants of agricultural land abandonment in Europe. *Science of The Total Environment* 644. DOI: <https://doi.org/10.1016/j.scitotenv.2018.06.326>
- Mamine, F., Fares, M., Minviel, J. J. 2020: Contract design for adoption of agrienvironmental practices: A meta-analysis of discrete choice experiments. *Ecological Economics* 176. DOI: <https://doi.org/10.1016/j.ecolecon.2020.106721>
- Nguyen, C., Latacz-Lohmann, U., Hanley, N., Schilizzi, S., Iftekhar, S. 2022: Spatial coordination incentives for landscape-scale environmental management: A systematic review. *Land Use Policy* 114. DOI: <https://doi.org/10.1016/j.landusepol.2021.105936>
- Organisation for economic co-operation and development 2013: Providing agri-environmental public goods through collective action. Paris. DOI: <https://doi.org/10.1787/9789264197213-en>
- Organisation for economic co-operation and development 2015: Public goods and externalities: Agri-environmental policy measures in selected OECD countries. Paris. DOI: <https://doi.org/10.1787/9789264239821-en>
- Prager, K. 2015: Agri-environmental collaboratives for landscape management in Europe. *Current Opinion in Environmental Sustainability* 12. DOI: <https://doi.org/10.1016/j.cosust.2014.10.009>
- Reed, M. S., Moxey, A., Prager, K., Hanley, N., Skates, J., Bonn, A., Evans, C. D. et al. 2014: Improving the link between payments and the provision of ecosystem services in agri-environment schemes. *Ecosystem Services* 9. DOI: <https://doi.org/10.1016/j.ecoser.2014.06.008>
- Riley, M., Sangster, H., Smith, H., Chiverrell, R., Boyle, J. 2018: Will farmers work together for conservation? The potential limits of farmers' cooperation in agri-environment measures. *Land Use Policy* 70. DOI: <https://doi.org/10.1016/j.landusepol.2017.10.049>
- Slovenec, M. 2019: Can a »good farmer« and a »bad farmer« cooperate?: An examination of conventional and organic farmers' perceptions of production and environmental protection. *Intertwining of Diverse Minds in(to) Political Ecology: Scientific Texts of Doctoral Students Participating in the Summer School of Political Ecology*. Ljubljana.
- Slovenec, M., Erjavec, E. 2021: Cooperation among farmers through the lens of their future orientations: A case study from Slovenia. *Anthropological Notebooks* 27. DOI: <https://doi.org/10.5281/zenodo.5789103>
- Šumrada, T., Erjavec, E. 2020: Zasnove kmetijsko-okoljskih ukrepov in njihove značilnosti. *Acta agriculturae Slovenica* 116-1. DOI: <https://doi.org/10.14720/aas.2020.116.1.1775>

- Šumrada, T., Japelj, A., Verbič, M., Erjavec, E. 2022: Farmers' preferences for result-based schemes for grassland conservation in Slovenia. *Journal for Nature Conservation* 66. DOI: <https://doi.org/10.1016/j.jnc.2022.126143>
- Šumrada, T., Kmecl, P., Erjavec, E. 2021a: Do the EU's Common Agricultural Policy funds negatively affect the diversity of farmland birds? Evidence from Slovenia. *Agriculture, Ecosystems and Environment* 306. DOI: <https://doi.org/10.1016/j.agee.2020.107200>
- Šumrada, T., Vreš, B., Čelik, T., Šilc, U., Rac, I., Udovč, A., Erjavec, E. 2021b: Are result-based schemes a superior approach to the conservation of High Nature Value grasslands? Evidence from Slovenia. *Land Use Policy* 111. DOI: <https://doi.org/10.1016/j.landusepol.2021.105749>
- Sutcliffe, L. M. E., Batáry, P., Kormann, U., Baldi, A., Dicks, L. V., Herzon, I., Kleijn, D. et al. 2015: Harnessing the biodiversity value of Central and Eastern European farmland. *Diversity and Distributions* 21-6. DOI: <https://doi.org/10.1111/ddi.12288>
- Valentinov, V. 2007: Why are cooperatives important in agriculture? An organizational economics perspective. *Journal of Institutional Economics* 3-1. DOI: <https://doi.org/10.1017/S1744137406000555>
- Villamayor-Tomas, S., Sagebiel, J., Olschewski, R. 2019: Bringing the neighbors in: A choice experiment on the influence of coordination and social norms on farmers' willingness to accept agro-environmental schemes across Europe. *Land Use Policy* 84. DOI: <https://doi.org/10.1016/j.landusepol.2019.03.006>
- Vlada Republike Slovenije 2015: Natura 2000. Management Programme (2015–2020). Ljubljana.
- Žibera, I. 2012: Spreminjanje rabe zemljišč v Halozah v obdobju med letoma 2000 in 2011. *Geografski obzornik* 59-1,2.
- Žvikart, M. 2010: Uresničevanje varstvenih ciljev iz programa upravljanja območij Natura 2000 v kmetijski kulturni krajini. *Varstvo narave* 24-24.

MOTIVATION, ROBUSTNESS AND BENEFITS OF WATER COMMONS: INSIGHTS FROM SMALL DRINKING WATER SUPPLY SYSTEMS

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A spring with a village water trough in Čadrg, The Julian Alps, Slovenia.

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Motivation, robustness and benefits of water commons: Insights from small drinking water supply systems

ABSTRACT: The article addresses the governance of water commons with an emphasis on drinking water. The study applied two conceptual frameworks: Ostrom's Design Principles and the Social-Ecological Systems framework. The empirical part refers to two water commons in Slovenia and is based on qualitative data from semi-structured interviews with locals and professionals. The article follows three objectives: 1) to identify the drivers and motivations for successful local water governance; 2) to assess the robustness of water commons in terms of current and future challenges; 3) to identify the benefits of water commons. The key elements for the functioning of the two local communities under examination are shared interests, as well as a strong commitment to effective management. In addition to the material benefits (i.e. drinking water supply), non-material ones are also important. Community building and identity are particularly noteworthy. The importance of small drinking water supply systems that are well organised and responsibly governed as commons is beneficial not only to a municipality but also to a country.

KEY WORDS: water governance, water cooperatives, community water management, community water cooperatives, Ostrom's Design Principles, local water resources management, Slovenia

Motivacija, prožnost in koristi vodnih zadrug: spoznanja iz majhnih sistemov za oskrbo s pitno vodo

POVZETEK: Članek obravnava delovanje vodovodnih zadrug, natančneje tistih, ki upravljajo s pitno vodo. Raziskava temelji na dveh konceptualnih okvirih: načelih oblikovanja Elinor Ostrom in socio-ekoloških sistemih (SES). Empirični del izhaja iz preučevanja dveh vodovodnih zadrug v Sloveniji in sloni na kvalitativnih podatkih iz polstrukturiranih intervjujev z domačini in strokovnjaki. Članek ima tri cilje: 1) identificirati dejavnike in motivacijo za uspešno lokalno upravljanje s pitno vodo, 2) oceniti prožnost vodnih zadrug v luči aktualnih in prihodnjih izzivov ter 3) opredeliti koristi vodovodnih zadrug. Ključna elementa za delovanje dveh obravnavanih lokalnih skupnosti sta skupni interesi in močna zavezanost k učinkovitemu upravljanju z vodnimi viri. Poleg materialnih koristi, kot je zagotavljanje pitne vode, so pomembne tudi nematerialne koristi, zlasti oblikovanje skupnosti in identiteta. Sklepna ugotovitev je, da so lokalni sistemi oskrbe s pitno vodo, s katerimi skupnosti preudarno in odgovorno upravljajo, pomembni in prinašajo koristi ne le občini, temveč tudi državi.

KLJUČNE BESEDE: upravljanje z vodo, vodovodne zadruge, skupnostno upravljanje z vodo, skupnostne vodne zadruge, Ostromina načela oblikovanja, upravljanje lokalnih vodnih virov, Slovenija

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1 Introduction

Water, the quintessential resource that sustains life on Earth, has long been regarded as a vital public good. Lately, it has been recognised as a common pool-resource. This shift in perception stems from the difficulty in restricting access to water and the undeniable fact that its availability can be limited by use or mismanagement (Ostrom and Ostrom 1977). Indeed, it is a vulnerable and conflict-prone resource (Amery 2002; Tucker 2014). Pollution and scarcity of drinking water pose pressing problems that compromise the natural environment and deprive people of a decent quality of life. Climate change, in particular, has been blamed for its widespread impact on water scarcity (Brunner et al. 2019; Vrzel et al. 2019; Terzi et al. 2021; Urbanc and Šmid Hribar 2021). Recently, there has been increasing pressure worldwide (Bakker 2007) and in Europe (Staddon 2016) to privatise water, leading to its commodification. Given that water underpins progress, plays a central role in climate change adaptation and is critical to human society (<https://www.unwater.org>), there are many calls for better and more sustainable water governance (Pahl-Wostl and Kranz 2010; OECD ... 2015).

Water governance can take a myriad of forms, practices or principles and can occur at different levels – (supra)national, regional, and local. The local level is becoming increasingly important. Around the globe, there are initiatives to give local communities control over water supply. In the last fifteen years, there has been a trend toward remunicipalisation, with previously privatized water utility companies returning to municipal hands – already implemented in 235 cities in 37 countries, among which the United States and European countries predominate (Kishimoto, Lobina and Petitjean 2015). In addition to the two main governance models – public or state, and private or corporate, there are two others: a hybrid one, i.e. a combination of decentralisation and marketisation (O'Reilly and Dhanju 2012), and a model that is often overlooked: the community or cooperative model (Bakker 2008). Using examples from Bolivia, Wales, and Finland, Bakker (2008) draws parallels between community participation in water governance and democratisation of water supply. A new step toward recognising the community relevance in water supply was taken during the consultation period for the recast of the 2020 European Drinking Water Directive, and as a result, the Alliance of Community-Owned Water Services in Europe was established (Deane and Domhnaill 2021).

Community drinking water governance exists in many countries around the world, mostly in rural and suburban areas (Deller et al. 2009; Takala et al. 2011; Arvonen et al. 2017), including 200 in Canada (Bakker 2007), 1,400 in Finland (Takala et al. 2011), 2,500 in Denmark, 5,000 in Austria (Nikolaou 2014), and 3,300 in the United States (Deller et al. 2009). In the Global South, the phenomenon is often associated with impoverished communities (Hofstetter, van Koppen and Bolding 2021); Bolivia: 15, Chile: 137 (International ... 2001), Sri Lanka: 37, and Kenya: 5,000 (Arvonen et al. 2017). The headwater position typically makes it easier to manage water resources and to ensure quality drinking water (Křeček and Haigh 2019), but also brings with it certain responsibilities downstream.

Lack of community participation is identified as a major impediment to effective water governance, for example in South Africa (Tyhotyholo and Ncube 2023). It is important to acknowledge the significant potential of community water governance on both political and implementation levels (Marston 2015; Rana and Piracha 2018; Katusiime and Schütt 2020). Despite the fact that water commons exist around the world, few studies have been conducted that address their characteristics, role, relevance, and development. The first gap is based on a comparative analysis of Finland and Kenya where Arvonen et al. (2017) suggest that future research on water cooperatives could address an in-depth study of the factors responsible for their successes and failures in different settings. The second gap is related to the lack of awareness in Slovenia that water can be governed by water cooperatives in the same way as common land is managed by agrarian communities. Water commons have been insufficiently studied; the authors of this paper are aware of only two studies that briefly mention water commons in Slovenia (Šmid Hribar et al. 2023; Šmid Hribar, Urbanc and Zorn 2023), unlike agrarian communities, which have attracted much scholarly attention (Vilfan 1996; Petek and Urbanc 2007; Bogataj 2012; Rodela 2012; Premrl et al. 2015; Šmid Hribar, Bole and Urbanc 2015; Šmid Hribar et al. 2018).

The aim of this article is to present and evaluate water commons governance in two local communities in Slovenia – Čadrg and Goriče – based on the Social-Ecological Systems framework (SES) (Ostrom 2009; McGinnis and Ostrom 2014) and Ostrom's Design Principles (DPs) (Ostrom 1990; 2005). Both cases provide interesting insights into water commons that independently govern their own water resources to ensure the supply of sufficient and safe drinking water for their residents. Other uses, such as pumping,

irrigation, and process water, are beyond the scope of this article. This article discusses the material, non-material, regulatory and social benefits of water commons understood as Nature's Contribution to People (NCP) (Díaz et al. 2015; Díaz et al. 2018). The NCP builds upon the concept of ecosystem services, which recognises that ecosystems provide a wide range of goods and services that are essential for human well-being. The NCP goes beyond the traditional focus on the direct provisioning of goods such as food, water, and timber, and also considers the various non-material benefits that nature provides. It highlights the multiple ways in which nature contributes to human life, culture, health, and overall quality of life.

The research study addresses three main research questions. Firstly, it examines the motivations that drive local communities to govern their own water resources. Secondly, it assesses the robustness of water cooperatives in facing present and future challenges. Finally, it examines the diverse benefits associated with water commons, including material, non-material, regulatory and social benefits, and identifies the various beneficiaries of these benefits.

2 Methods

2.1 The territorial context: Slovenia

Within Europe, Slovenia stands out for its low population density and dispersed settling, whereby half of the population is rural and half urban. The country is rich in water resources due to above-average rainfall compared to both Europe and the rest of the world, diverse rock composition, altitude, and topography (Hrvatín, Komac and Zorn 2020). Institutionalised water supply has a long tradition, e.g. in Celje (Rihter 2008). Three facts are vital for a modern water supply: 1) drinking water is regulated by national legal provisions (Eman, Kuhar and Meško 2020); 2) water supply is the responsibility of individual municipalities; 3) according to the Slovenian legislation, water supply systems are divided into public and private. A private system is only possible in cases where the drinking water supply serves less than 50 inhabitants. Public water systems are organised as municipal utility companies and provide a public service (Uredba ... 2012). In 2002, almost 91% of Slovenian population had access to public water supply systems operated by 102 public service providers (Čuček 2011). The rest, 196,400 inhabitants, use drinking water from small drinking water supply systems (Kozelj and Drev 2017), which are mostly fed from small springs or boreholes. They require a water permit to operate and a total of 20,013 permits have been issued (Meljo, Krajčič and Smolar Žvanut 2017).

The dispersed water supply is related to dispersed settling. Many small water supply systems are the result of local initiatives, self-organisation of village communities and so-called self-imposed financial and in-kind contributions dating back to the 1960s. This pattern of the drinking water supply system continues into the present day. Most often, small water systems – if they are unable to comply with the Decree on Drinking Water Supply (Uredba ... 2012) and Water Framework Directive (2000) – are transferred to the management of larger public water utility companies due to financial and human constraints (Rejec Brancelj et al. 2011; WRc 2017).

Between 2010 and 2015, the ownership of some Slovenian food and beverage companies, which own 17 of the country's 29 water boreholes, was transferred to multinationals, for example, Heineken (Golubović 2016). This spurred a heated debate about water as a public good. Indeed, water is widely perceived as a public good available to all (Loen and Gloppen 2021). This led to constitutionalisation of the right to drinking water in 2016. Article 70a of the Constitution of the Republic of Slovenia stipulates that water resources are primarily intended for supplying the population (household needs) with drinking water and they do not constitute a market good. Water is a public good administered by the state and therefore cannot be disposed of. Despite the best intentions, the constitutional provision on water raises new dilemmas. It transfers the responsibility for water governance from municipalities to the state, which is to govern water directly and non-profitably through self-governing local communities.

One form of self-governing local communities in the water supply sector are water commons with different levels of formal arrangements. There are currently eleven (Uredba o spremembah ... 2013) or twelve (Avsec and Štromajer 2015) water commons with a set formal status that are legally organised as water cooperatives. Data on informal water cooperatives are non-existent (Pipan, Šmid Hribar and Urbanc 2018).

2.2 Case studies: Goriče Water Cooperative and Čadrg Water Committee

To study the importance of water commons, the authors of this study selected two examples, an informal Water Committee – Čadrg, and a fully registered one – Goriče. The Čadrg Water Committee is a decade-old form of local self-governance. Conversely, the Goriče Water Cooperative is seven decades old, but its legal form has been changing to conform to national and EU legislation.

The community of Goriče is situated in the foothills of the Kamnik and Savinja Alps, ten kilometres north of Kranj, the fourth-largest town in Slovenia and the capital of north-western Slovenia. Kranj is the seat of the municipality with 58,527 inhabitants. Golnik Hospital, which specialises in lung diseases, has been located in the neighbourhood since the 1920s. Its development had an economic, social and cultural influence on the wider area. In 2022, the Cooperative supplied water to 248 stakeholders or households (each with one share) and provides water to 690 inhabitants in four settlements: Goriče (471 m above sea level), Srednja vas (495 m), Zalog (530 m), Letenice (440 m). This is roughly one tenth more than when the water system was built. The system supplies 18 large consumers, 17 dairy farms and one primary school.

Čadrg (685 m) is an isolated mountain village in the Julian Alps in western Slovenia near the border with Italy. It is part of the sparsely populated municipality of Tolmin with 11,281 inhabitants and is characterised by its border location, remoteness, demographic deprivation and peripheral location. The Water Cooperative (the so-called Čadrg Water Committee) supplies water to 46 inhabitants, whose number has been increasing since its establishment. Čadrg stands out in the municipality due to its high proportion of young inhabitants. The village dairy is the only large consumer.

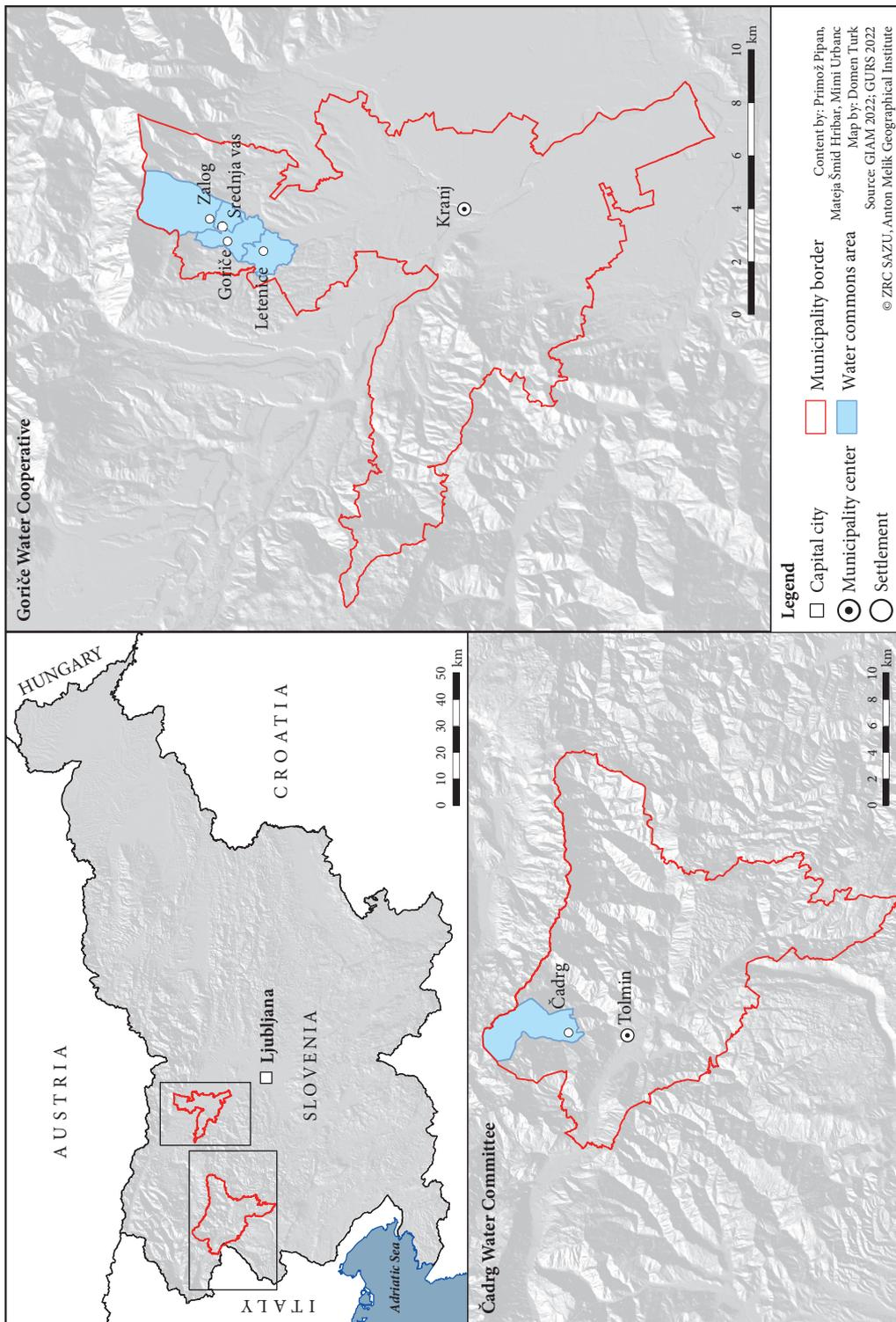
2.3 Conceptual framework

This study employed two conceptual frameworks for understanding and analysing the governance of water commons. Firstly, DPs (see Table 1) provide a set of guidelines to assess the robustness of both water commons in self-organising for governing and managing their water resources. Secondly, the SES recognises that social systems and ecological systems are interconnected and mutually influencing. It emphasizes the need to consider the interactions between human behaviour, institutions, and the natural environment in order to understand the dynamics of resource governance.

Furthermore, in order to capture the broader benefits of community water governance, the authors of this study applied the principles from the concept of NCP (Díaz et al. 2015; Díaz et al. 2018). In addition, they also considered the social contribution that commons can provide to people as an essential form of social capital: social networks, trust and norms, similar to those assessed in Šmid Hribar et al. (2023).

2.4 Data collection

The empirical part is based on two water commons: The Čadrg Water Committee and the Goriče Water Cooperative. The primary data is based on fieldwork, which included a workshop in Čadrg (December 2015, 8 participants from different sectors) and seven semi-structured in-depth interviews with stakeholders (March 2016), followed by a series of interviews with the Committee's president. In Goriče, a series of interviews with three stakeholders took place between June 2016 and May 2017. To complement the data, the authors interviewed four professionals from the municipalities of Tolmin and Kranj and the public utility company Komunala Kranj (August 2016). The final stage of data collection was carried out in September and October 2022. Interviews were carried out by phone with representatives of both water commons, with a focus on the benefits of water commons. Additional data on benefits were collected as part of the study on commons related to Slovenian cultural landscapes (for the detailed set of variables see Šmid Hribar, Urbanc and Zorn 2023). Secondary data is based on available literature and legal documents concerning drinking water.



3 Results

3.1 What drives local communities to govern their water resources

While both the Goriče Water Cooperative and the Čadrg Water Committee aim to ensure access to safe drinking water, their drivers differ in terms of initial motivation, ownership structure, and governance practices. The Goriče Water Cooperative was established to supply healthy food to a nearby hospital and retains control over the water system, while the Čadrg Water Committee emerged from the need for safe drinking water for the village dairy and operates as a recognised private water system governed by a community board.

3.1.1 Goriče Water Cooperative

The need to produce healthy food, especially milk, for the nearby Golnik Hospital generated the idea of building a water supply system in Goriče and the neighbouring settlements as early as 1937. The Goriče Water Cooperative was founded in 1938. The Second World War brought preparations to a standstill, but by 1946 and 1947, inhabitants – members and non-members – had already moved 7,000 m³ of earth by hand and built the water pipeline (Zadružna ... 1995; Košir 2011). When the Goriče Local Community was established – the 1974 Constitution of the Socialist Republic of Slovenia introduced local communities as the lowest administrative units (Fink-Hafner and Kropivnik 2006) – the water supply system passed into its hands.

In 1994, when the Local Self-Government Act came into force, the powers of local communities were relinquished to municipalities. The residents of Goriče decided not to hand over their water system to the Municipality of Kranj or to its operator – the public utility company Komunalna Kranj. Based on the Cooperatives



Figure 2: The area of the Goriče Water Cooperative on the alluvial fan below the Kamnik and Savinja Alps.

Act (Zakon ... 1992), the majority of the households of the Goriče local community re-established the Goriče Water Cooperative in 1995. It pursues its original purpose, i.e. to supply sufficient quantities of safe drinking water at an affordable price to its stakeholders. To achieve this, the water supply network was renovated in line with modern standards, including ultraviolet water treatment. All revenues are used exclusively for the operation of the system.

The water is supplied from three wells: two are located on the Water Cooperative's land and one is on the land of a member of the cooperative. The land on which the water reservoirs are located is owned by the members of the cooperative and the cooperative itself. Despite the ever more challenging precipitation pattern, the Water Cooperative expects to be able to continue fulfilling its ambition, especially because a big increase in the number of inhabitants is not foreseen.

The initial establishment of the Water Cooperative was incredibly progressive. It reflected forward-thinking, self-initiative and social cohesiveness. Two factors were important: the Golnik Hospital and existing examples of water systems in the region. The last reorganisation, which was a *de jure* reestablishment, was an act of civil disobedience towards the municipality, again based on self-initiative and social cohesiveness.

3.1.2 Čadrg Water Committee

The village of Čadrg has extensive experience in community-based initiatives. The villagers themselves built the road to the village between 1972 and 1990 by hand. In 1998, they made the empty building of the former school available to the Don Pierino Community for the treatment of drug addicts (Pipan 2004). Governance of the water supply was another of the community practices, albeit unprofessionally and informally. In 2010, the location of the old water reservoir was found to be problematic in terms of health standards, as it was located in a pasture area. The village dairy, which produces organic Tolminc cheese in particular, was dependent on safe drinking water, therefore an immediate solution to the problem was needed.



JURE TITČAR

Figure 3: The area of the Čadrg Water Committee in the Julian Alps in Triglav National Park.

There were two options: 1) governance of the water system could be handed over to the public utility company Komunalna Tolmin; 2) villagers' water rights could be transferred to the Municipality of Tolmin, which should provide safe water via Komunalna Tolmin. Both options foresaw the chlorination of water. The only way to keep the water unchlorinated was to retain the governance locally. This option was voted through a full majority at a community meeting. The villagers formed a Water Committee to build a new well and a new reservoir on a forested land away from the old one. The new water system, equipped with ultraviolet treatment, became operational in November 2011.

In view of the Decree on Drinking Water Supply (Uredba ... 2012), which defines water systems in settlements with less than 50 inhabitants as private, the Čadrg residents themselves applied for a water permit, which was issued in 2012. As a result of this act, the community water system officially became a private water system with joint ownership governed by a seven-member board.

The Water Committee is considered to be a newly established commons whose governance practices were inspired by centuries-old practices of land commons, i.e. agrarian communities (Premrl et al. 2015). In Čadrg, the Agrarian Community has survived political, economic and social turbulence in the last hundred years.

The main external threat is water shortage due to climate change. The greatest internal weakness is an irresponsible attitude due to the failure to thoroughly check and report leak on a regular basis. The establishment of the Committee was progressive, especially because commons in Slovenia and globally have been in decline (Brown 2006; Premrl et al. 2015). It reflected environmental awareness, self-initiative, social cohesiveness and mutual trust.

3.2 Robustness of water commons

The authors of this study examined the applicability of Ostrom's (1990; 2010) eight DPs to analyse the robustness of two Slovenian water commons with a clear bottom-up self-governance. Despite the nationally favourable attitude to commons in general; for example, tradition (Avsec and Štromajer 2015), and specifically for water commons, the challenges in water governance and strict sanitation requirements are leading to pressure to transfer the governance of water resources to a municipal utility company, for example, in Goriče.

3.3 Benefits of water commons

The water resources governed by both rural local communities bring regulatory, material and non-material benefits. In addition to accessibility to drinking water, the ability to regulate the drinking water quality is important to local people (Table 2). The option of chlorinating the water or instead using ultraviolet lamp treatment is their choice and responsibility. Among the non-material benefits, the locals of Čadrg identified learning, inspiration and strong support for the local identity. They are proud to drink their own water. In Goriče, the non-material benefits included strengthening the community and identity, as well as the ability to use the water resource to preserve the potential for future generations.

Water governance brings social benefits to both local communities. In Čadrg, members build trust and share common norms and values through the water commons. In Goriče, there is a perceived outward integration of the water cooperative with other networks. The Volunteer Firefighters Association and the Agrarian Community manage and maintain the landscape of the water catchment area.

The interviews revealed that locals also recognise the importance of headwater managing. This brings additional, mainly regulating benefits. Erosion prevention and landslide control measures are being implemented to maintain the balance and regulate the water source in Goriče. There is an awareness that surface water needs to be monitored and managed, otherwise it could endanger ground water or cause turbidity in drinking water. Through regular checks, they ensure that there are no carcasses of dead wild animals in the water catchment area and that new forest tracks do not interfere with waterways. In Čadrg, no special regulatory measures targeted at the water source have been taken, but by the time of their self-organisation, environmentalism had already taken over the media and social discourse. Having had experience with the unsuitable location of the former water reservoir, they have thoughtfully located the new reservoir to eliminate potential problems.

Table 1: Conformity of both water commons with DPs.

DPs	Čadrg Water Committee	Goriče Water Cooperative
1 Clearly defined boundaries of resource and users	YES. A resource boundary overlaps with the natural catchment area of the reservoir and is not signposted. Use rights are connected to the local residence address. The owners of the water supply system are all land (residential) owners in the village of Čadrg. The owner of the land in the catchment area is the Agrarian Community (joint ownership).	YES. A resource boundary overlaps with the natural catchment area of the reservoirs and is not signposted. Use rights are connected to the local residence address; no one is to be excluded. The owner of the water supply system is the Goriče Water Cooperative, which is based on voluntary membership (90% of the users are members). The land in the catchment area is owned by the Cooperative's members and the Agrarian Community (joint ownership).
2 Proportional equivalence between benefits and costs	YES. Once yearly, users pay according to the distribution key, which follows the water consumption regulations of the Municipality of Tolmin. The payment also covers monitoring and operation. The quantity ceiling per household is not stipulated. In case of water shortage, users are asked in advance to reduce water consumption as a precautionary measure to avoid complete interruptions. The responsibility of users is to use water sparingly when inflow is low, to report immediately when a leak is noticed and to pay for the service.	YES. Twice yearly, users pay according to the quantity of water consumed. The payment also covers monitoring and operation. A flat-rate for the network charge is added. There is no difference in benefits and costs between members and non-members. The quantity ceiling per user is not stipulated. In case of water shortages, there are graduated mitigation measures (from restrictions on certain activities, e.g. car washing, to temporary general reductions in supply). The responsibility of users is to use water sparingly when inflow is low and to pay for the services.
3 Collective-choice arrangements (participation in the decision-making process)	YES. The Committee has tailored its operation to the local geographical (quantity of water, location of water sources) and (supra)national legal environment. There are no rules of operation or statutes. Representatives (one per household) meet once a year, usually in December, to set the unit price. If necessary, they may hold additional meetings.	YES. The operation has been tailored to the local geographical (quantity of water, location of water sources) and (supra)national legal environment. General rules of cooperatives apply. There are three levels of governance: the president, the board of directors and the general assembly (called once a year). The board of directors fixes the unit price. A group of members can call an extraordinary general assembly and propose changes. Non-members cannot participate in modifying rules. Since its establishment, the operational rules have only been amended to comply with legislation.
4 Monitoring of resource and users	YES and NO. National regulations lay down water quality parameters. Water quality monitoring is imposed from above. The resource quantity monitoring is self-imposed. There is only one common water meter. Peer pressure becomes relevant in case of shortages, as the Committee is not in a position to monitor excessive water consumption.	YES and NO. National regulations lay down water quality parameters. Water quality monitoring is imposed from above. The resource quantity monitoring is self-imposed. Each user has a water meter. Peer pressure becomes relevant in case of shortages, as the Cooperative is not in a position to monitor excessive water consumption. They keep a close watch on the water catchment area.
5 Graduated sanctions (proportionate sanctions)	YES. There is a little leeway for rule violations. Misconduct takes the form of irresponsible behaviour (failure to comply with austerity measures in a dry season or failure to report a leak in the system).	YES. There is a little leeway for rule violation. Misconduct takes the form of irresponsible behaviour (failure to comply with austerity measures in a dry season).
6 Conflict-resolution mechanisms	YES. Conflicts arise only when members do not perform their duties properly, e.g. they do not thoroughly check where the leak is. Disputes are resolved on an ongoing basis. The stages are: 1) negotiations, 2) a personal warning is issued to the offenders, 3) a meeting of all users where a specific problem is on the agenda.	YES. There are occasional conflicts connected with rights of usufruct as routes of the water network, which run through private land, are sometimes disputed. Small problems are solved by negotiation, while bigger ones by applying the Cooperative's rules and at a general assembly.
7 Minimal recognition of rights to organize	YES and NO. The Committee is an informal organisation without statutes. It operates within the framework of the Čadrg village council, which in itself is also an informal entity, however, the water permit entitles it to provide water.	YES. The Cooperative is a legal entity organised under the Cooperatives Act (Zakon . . . 1992). It is listed in the Slovenian Business Register.

DPs	Čadrg Water Committee	Goriče Water Cooperative
8 Nested enterprises	YES and NO. Functioning must comply with legislation (municipal, national, EU-wide). The Water Committee is not vertically integrated into the Municipality and does not have a legal subjectivity of its own. However, they do cooperate exemplarily. It is integrated horizontally with the Agrarian Community, which owns the land in the catchment area.	YES and NO. Functioning must comply with legislation (municipal, national, EU-wide). The Cooperative is not vertically integrated into the Municipality. Mutual mistrust between the Municipality and the Cooperative is always present. Pressure from the Municipality is fierce. The Cooperative is integrated horizontally with the Agrarian Community and the local Volunteer Firefighters Association.

Table 2: Benefits of community governance with water resources in Čadrg and Goriče.

Selected cases		Čadrg	Goriče	
Type of commons	Traditional		x	
	Transforming			
	New	x		
Geographical area	Rural	x	x	
	Urban			
Nature's contribution to people (NCP)	Regulating	Habitat creation and maintenance		
		Pollination and dispersal of seeds and other propagules		
		Regulation of air quality		
		Regulation of climate		
		Regulation of ocean acidification		
		Regulation of freshwater quantity, location and timing		
		Regulation of freshwater and coastal water quality	x	x
		Formation, protection and decontamination of soils and sediments		
		Regulation of hazards and extreme events		
	Material	Energy		
		Food and feed	x	x
		Materials, companionship and labour		
		Medicinal, biochemical and genetic resources		
		Non-material	Learning and inspiration	x
			Physical and psychological experiences	
Supporting identities	x		x	
	Maintenance of options		x	
Social contribution	Social networks		x	
	Trust and reciprocity	x		
	Shared norms and values	x		
Additional measures to maintain regulation of NCP	Yes		x	
	No	x		

4 Discussion

The answer to the question of why some local communities have succeeded in retaining successful water governance until today is complex and structured. There are several decisive factors related to the local-specific and the general, i.e. national, context.

The general attitude in Slovenia towards water as a public good available to all (Loen and Gloppen 2021) and global initiatives for local communities to control water supply (Kishimoto, Lobina and Petitjean 2015) support the endeavours of both water commons. The cases examined in this study have shown that community water governance can be an alternative to mainstream governance models – public and private, which is congruent with evidence in published literature (Bakker 2008).

Water commons need strong motivation from the outset through to the mature stage of operation. The key motivation is connected with agriculture, which functions as a backbone activity in both cases. In dairy farming, the need for sufficient and safe water became evident. In Čadrg, the need for chlorine-free water for the production of organic cheese was the immediate motive for the setting up of a water common. In Goriče, the motives were broader and related to the economic and social development of the area half a century earlier. The persistence is also attributable to milk production, which requires large quantities of water. For this reason, the farmers, who are also landowners, are the driving force behind the actions – either directly or indirectly through the Agrarian Community. Greater momentum for actions is observed if the communities consist of younger members. The results confirm widely established findings (e.g. Ostrom 1990; Ostrom 2005; Bravo and Marelli 2008; Gatto and Bogataj 2015) that communities are capable of governing their resources through cooperation and dialogue, provided they have a common interest.

Both water commons have been able to emerge and survive because of the strong commitment of proactive individuals, backed by a strong and cohesive local community. Water commons act as a link between communities and provide a great example of community building. Hence, this study has advanced the current literature by stating that it is not only about water supply or service to residents, but also about social capital, identity, and coherent vanguard community. This is in line with the findings of Heinmiller (2009) who claims that in governing many common-pool resources, institutional legacies may be just as important as the knowledge, preferences, and mutual trust of current stakeholders.

Both water commons must also be understood in the context of marginality. Both communities are located in a headwater on the edge of the municipality. Čadrg's marginality is even more pronounced, not only because of its position on the western periphery of Slovenia but also because of its mountainous location and altitude. The feeling of being ignored and left to one's own devices is strong in both areas, and the commons are a form of a local initiative and resistance to municipal centralisation. This feeling is particularly strong in Goriče, where the pressure from the municipality to take over their local water resource is ever-present. The governance of water carries an element of mistrust towards the municipality and, as a consequence, of rebellion and civil-society activism.

Of Ostrom's eight DPs, DPs 7 and 8 refer to the importance of the state's role. In this case, the state sets a general legal framework and requires registration of the water source use, but it does not otherwise interfere with governing. The commons' stakeholders can develop self-organising institutions to self-govern their own water resources. Although the Goriče Water Cooperative was found to be more compliant with the DPs and is therefore more robust than the Čadrg Water Committee, neither of them meets all the DPs. Monitoring (DP 4) and Nested enterprise structures (DP 8) – both horizontal, appear to cover some spectrum in both cases. In the case of the Čadrg Water Committee, Minimal recognition of rights to organise (DP 7) is informal. It has a right to organise, but the degree of formality is very low.

Robustness is equated with long duration, lasting from centuries to a millennium, through many ups and downs, and many adaptive changes to disturbances (Anderies, Janssen and Ostrom 2004). However, none of the commons studied has such a long tradition, with the Goriče Water Cooperative having a longer tradition than the Čadrg Water Committee. Therefore, and due to better developed DPs, the Goriče Water Cooperative is more robust than the Čadrg Water Committee.

Both cases show that water commons bring various benefits (nature contribution) to people. In addition to the material benefit, i.e. drinking water, a myriad of non-material benefits can be singled out. Supporting the identity and providing opportunities for learning and generating inspiration are experiential. Among social benefits, networking with other entities, building trust and reciprocity, and sharing common norms and values were identified.

Both water commons demonstrate a high degree of responsibility towards the local community, the water source, and ultimately the landscape. This level of responsibility – supported by knowledge, awareness and economic stability – enables water commons to provide sufficient and safe drinking water.

Both water commons have prior positive experiences with self-governance from agrarian communities and are therefore aware of the benefits of governing their own natural resources. Previous experiences have empowered them in self-recognition of their know-how and capabilities. This leads to a notion that was not explicitly mentioned but was sensed throughout the interviews, namely path dependency. Water commons' representatives seem to be aware of the complex physical and social environment in which they function, but when it comes to approaches to achieving goals and missions, they constantly refer to earlier experiences and decisions. Water commons are not perceived as an achievement, but rather as a natural deed for the benefit of the community. In terms of path dependency, governing one's own water resources is not a goal, but a long-term tool to sustain the local community's independence in water provision. In this way, they can set their own water price, which is much lower and more affordable than that of the municipal utility companies. There are no elements of game-playing or tactics, but minimal adjustability to the legal framework.

The elements that make common governing in both cases possible are: strong motivation, a voluntary aspect, and democratic decision-making, which are in agreement with published literature (Arvonen et al. 2017). The elements that make selected cases different are: size, degree of formality, motivation, longevity of tradition, and benefits that water caters to local inhabitants, which is consistent with the established literature (Takala et al. 2011).

The results are consistent with other literature showing that water commons are a suitable form of governing common-pool resources (Deller et al. 2009; Takala et al. 2011; Arvonen et al. 2017), provided they are able to overcome social dilemmas and recognize a common interest in preserving their resources (e.g. Ostrom 1990; Ostrom 2005; Bravo and Marelli 2008; Gatto and Bogataj 2015).

The findings of this article can have implications for governance and policy. Raising awareness of each individual and small communities through a policy of small steps is of paramount importance. Each individual influences and changes the common good through their behaviour, whether unwittingly or willingly. Communities with natural resources should build on informed and empowered local communities that pose and are aware of the value of natural resources and what they can do for them. Rather than putting pressure on water commons, municipalities should strive to achieve interdependencies between the local and municipal levels. This would help water commons build greater robustness and municipalities to capitalise on them to achieve a higher level of municipality coherence and identity.

5 Conclusions

This study focused on identifying the factors of successful water commons, their robustness and the benefits they bring to a local community. To address the issue of local governance of water resources, case studies of two contrasting water commons in Slovenia were used.

The conceptual lens consists of the SES and DPs to gain insight into the resources and their users within the local context. The underlying factors that enable both water commons to function are strong economic/material interest, passionate commitment, understanding of the commons as a tool to mitigate marginality and soft resistance towards municipality centralisation. In terms of robustness, none of the commons fulfils all the DPs. The weak points are monitoring, vertical positioning, and in the case of Čadrg, additionally lack of formality. The benefits are directly linked to the drivers and motivation. There are material and non-material benefits. Among the latter, community building and identity stand out. The concepts that bind all these aspects together are self-initiative, social cohesiveness and path-dependency.

For this reason, a policy implication would be to deploy local collective actions as a tool to achieve greater coherence within a municipality. It is important to achieve mutual interdependencies between the local and municipal levels. The practical implications of the study confirm Ostrom's findings that communities are capable of governing their resources through cooperation and dialogue, provided they have a common interest. The importance of local small water systems that are well organised and responsibly governed should be seen as a benefit, not only to a municipality but also to a country. As examples of shared

water governance, they are good role models for educating the public about the importance and value of common-pool resources governing.

If local communities want to maintain control over their own small drinking water supply systems and govern and manage them independently, they should not turn them over to public utility companies, as this is an irreversible decision. By assuming responsibility for their own governance and management, communities benefit both financially and in terms of the potential advantages of accessing unchlorinated water.

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6 References

- Amery, H. A. 2002: Water wars in the Middle East: A looming threat. *The Geographical Journal* 168-4. DOI: <https://doi.org/10.1111/j.0016-7398.2002.00058.x>
- Anderies, J. M., Janssen, M. A., Ostrom, E. A. 2004: A framework to analyze the robustness of social-ecological systems from an institutional perspective. *Ecology and Society* 9-1. DOI: <https://doi.org/10.5751/es-00610-090118>
- Arvonen, V., Kibocha, S. N., Katko, T. S., Pietilä, P. 2017: Features of water cooperatives: A comparative study of Finland and Kenya. *Public Works Management and Policy* 22-4. DOI: <https://doi.org/10.1177/1087724X17715267>
- Avsec, F., Štromajer, J. 2015: Development and socioeconomic environment of cooperatives in Slovenia. *Journal of Co-operative Organization and Management* 3-1. DOI: <https://doi.org/10.1016/j.jcom.2015.02.004>
- Bakker, K. 2007: The »commons« versus the »commodity«: Alter-globalization, anti-privatization and the human right to water in the Global South. *Antipode* 39-3. DOI: <https://doi.org/10.1111/j.1467-8330.2007.00534.x>
- Bakker, K. 2008: The ambiguity of community: Debating alternatives to private-sector provision of urban water supply. *Water Alternatives* 1-2.
- Bogataj, N. 2012: Model delovanja slovenskih agrarnih skupnosti. *Soupravljanje naravnih virov: vaške skupnosti in sorodne oblike skupne lastnine in skupnega upravljanja*. Wageningen.
- Bravo, G., Marelli, B. 2008: Irrigation systems as common-pool resources. *Journal of Alpine Research/Revue de Géographie Alpine* 96-3. DOI: <https://doi.org/10.4000/rga.536>
- Brown, K. M. 2006: New challenges for old commons: The role of historical common land in contemporary rural spaces. *Scottish Geographical Journal* 122-2. DOI: <https://doi.org/10.1080/00369220600917412>
- Brunner, M. I., Björnsen Gurung, A., Zappa, M., Zekollari, H., Farinotti, D., Stähli, M. 2019: Present and future water scarcity in Switzerland: Potential for alleviation through reservoirs and lakes. *Science of the Total Environment* 666. DOI: <https://doi.org/10.1016/j.scitotenv.2019.02.169>
- Čuček, S. 2011: Water supply, wastewater treatment and irrigation in Slovenia compared to the EU. *Water management in Slovenia*. Celje.
- Deane, B., Domhnaill, B. M. 2021: The alliance of community-owned water services in Europe: Opportunities and challenges based on the Irish perspective. *Water* 13-22. DOI: <https://doi.org/10.3390/w13223181>
- Deller, S., Hoyt, A., Hueth, B., Sundaram-Stukel, R. 2009: Research on the economic impact of cooperatives. Internet: <http://reic.uwcc.wisc.edu/water/> (30. 11. 2022).
- Díaz, S., Demissew, S., Carabias, J., Joly, C., Lonsdale, M., Ash, N., Larigauderie, A., et al. 2015: The IPBES Conceptual Framework – connecting nature and people. *Current Opinion in Environmental Sustainability* 14. DOI: <https://doi.org/10.1016/j.cosust.2014.11.002>
- Díaz, S., Pascual, U., Stenseke, M., Martín-López, B., Watson, R.T., Molnár, Z., Hill, R. 2018: Assessing nature's contributions to people. *Science* 359-6373. DOI: <https://doi.org/10.1126/science.aap8826>
- Eman, K., Kuhar, S., Meško, G. 2020: Access to safe and affordable drinking water as a fundamental human right: The case of the Republic of Slovenia. *The Emerald Handbook of Crime, Justice and Sustainable Development*. Bingley.

- Fink-Hafner, D., Kropivnik, S. 2006: Politična udeležba v posocializmu: med deformirano modernostjo, novo modernizacijo in postmodernostjo. *Družboslovne razprave* 22-51.
- Gatto, P., Bogataj, N. 2015: Disturbances, robustness and adaptation in forest commons: Comparative insights from two cases in the Southeastern Alps. *Forest Policy and Economics* 58. DOI: <https://doi.org/10.1016/j.forpol.2015.03.011>
- Golubović, B. 2016: Predlogi na osnutek ustavnega zakona – pravica do pitne vode. Internet: [http://voda.svo-boda.si/sprememba-ustave/predlogi-na-osnutek-ustavnega-zakonapravica-do-pitne-vode/Informacijski sistem javnih služb](http://voda.svo-boda.si/sprememba-ustave/predlogi-na-osnutek-ustavnega-zakonapravica-do-pitne-vode/Informacijski_sistem_javnih_sluzb) (28. 12. 2022).
- Heinmiller, T. 2009: Path dependency and collective action in common pool governance. *International Journal of the Commons* 3-1. DOI: <https://doi.org/10.18352/ijc.79>
- Hofstetter, M., van Koppen, B., Bolding, A. 2021: The emergence of collectively owned self-supply water supply systems in rural South Africa – what can we learn from the Tshakhuma case in Limpopo? *Water SA* 47-2. DOI: <https://doi.org/10.17159/wsa/2021.v47.i2.10921>
- Hrvatini, M., Komac, B., Zorn, M. 2020: Water resources in Slovenia. *Water resources management in Balkan countries*. Cham. DOI: https://doi.org/10.1007/978-3-030-22468-4_3
- International Labour Office, 2001. Promotion of cooperatives. International Labour Conference, 89th Session. Geneva. Internet: <https://www.ilo.org/public/english/standards/relm/ilc/ilc89/pdf/rep-v-1.pdf> (22. 12. 2022).
- Katusiime, J., Schütt, B. 2020: Integrated water resources management approaches to improve water resources governance. *Water* 12-12. DOI: <https://doi.org/10.3390/w12123424>
- Kishimoto, S., Lobina, E., Petitjean, O. (eds.) 2015: Our public water future. The global experience with remunicipalisation. Amsterdam, London, Paris, Cape Town, Brussels.
- Košir, M. 2011: *Moja pot skozi čas*. Ljubljana.
- Kozelj, D., Drev, D. 2017: Možnost kontaminacije pitne vode in varnostni ukrepi. *Drugi slovenski kongres o vodah*. Ljubljana.
- Křeček, J., Haigh, M. 2019: Land use policy in headwater catchments. *Land Use Policy* 80. DOI: <https://doi.org/10.1016/j.landusepol.2018.03.043>
- Loen, M., Gloppen, S. 2021: Constitutionalising the right to water in Kenya and Slovenia: Domestic drivers, opportunity structures, and transnational norm entrepreneurs. *Water* 13-24. DOI: <https://doi.org/10.3390/w13243548>
- Marston, A. 2015: Autonomy in a post-neoliberal era: Community water governance in Cochabamba, Bolivia. *Geoforum* 64. DOI: <https://doi.org/10.1016/j.geoforum.2013.08.013>
- McGinnis, M. D., Ostrom, E. 2014: Social-ecological system framework: initial changes and continuing challenges. *Ecology and Society* 19-2. DOI: <https://doi.org/10.5751/ES-06387-190230>
- Meljo, J., Krajčič, J., Smolar Žvanut, N. 2017: *Raba voda v Sloveniji*. *Drugi slovenski kongres o vodah*. Ljubljana.
- Nikolaou, K. 2014: Another world exists: Thousands of water co-operatives on the planet. *Aigua és Vida*. Internet: <https://www.aiguaesvida.org/another-world-exists-thousands-of-water-cooperatives-on-the-planet/> (10. 11. 2022).
- OECD Principles on Water Governance 2015. Internet: <https://www.oecd.org/cfe/regionaldevelopment/OECD-Principles-on-Water-Governance.pdf> (24. 12. 2022).
- O'Reilly, K., Dhanju, R. 2012: Hybrid drinking water governance: Community participation and ongoing neoliberal reforms in rural Rajasthan, India. *Geoforum* 43-3. DOI: <https://doi.org/10.1016/J.GEOFORUM.2011.12.001>
- Ostrom, E. 1990: *Governing the Commons: The Evolution of Institutions for Collective Action*. Cambridge.
- Ostrom, E. 2005: *Understanding institutional diversity*. Princeton.
- Ostrom, E. 2009: A general framework for analysing sustainability of social-ecological systems. *Science* 325-5939. DOI: <https://doi.org/10.1126/science.1172133>
- Ostrom, E. 2010: Beyond markets and states: Polycentric governance of complex economic systems. *The American Economic Review* 100-3. DOI: <https://doi.org/10.1257/aer.100.3.641>
- Ostrom, V., Ostrom, E. 1977: *Public goods and public choices. Alternatives for Delivering Public Services*. New York.
- Pahl-Wostl, C., Kranz, N. 2010: Water governance in times of change. *Environmental Science and Policy* 13-7. DOI: <https://doi.org/10.1016/j.envsci.2010.09.004>
- Petek, F., Urbanc, M. 2007: *Skupna zemljišča v Sloveniji*. *Geografski vestnik* 79-2.

- Pipan, P. 2004: Čadrg: primer don Pierinove skupnosti kot dodatne priložnosti za razvoj podeželja. Geografski obzornik 51-4.
- Pipan, P., Šmid Hribar, M., Urbanc, M. 2018: The role of local community in governing water as a common-pool resource. Alpine water – common good or source of conflicts. Breitenwang.
- Premrl, T., Udovč A., Bogataj, N., Krč, J. 2015: From restitution to revival: A case of commons re-establishment and restitution in Slovenia. Forest Policy and Economics 59. DOI: <https://doi.org/10.1016/j.forpol.2015.05.004>
- Rana, M., Piracha, A. 2018: Supplying water to the urban poor: Processes and challenges of community-based water governance in Dhaka city. Management of Environmental Quality 29-4. DOI: <https://doi.org/10.1108/MEQ-11-2017-0127>
- Rejec Brancelj, I., Jerič, M., Zupan, F., Nagode, P. 2011: Medresorska odgovornost pri izvajanju Načrta upravljanja voda 2009–2015 in učinkovitejše poti za doseganje dobrega stanja voda. Upravljanje voda v Sloveniji. Celje.
- Rihter, A. 2008: 100 let vodovoda v Celju. Celje.
- Rodela, R. 2012: Uvod v skupno lastnino in skupno upravljanje naravnih virov. Soupravljanje naravnih virov: vaške skupnosti in sorodne oblike skupne lastnine in skupnega upravljanja. Wageningen. Internet: <https://edepot.wur.nl/205876> (10. 10. 2022).
- Staddon, C. 2016: Managing Europe's Water Resources. New York.
- Šmid Hribar, M., Bole, D., Urbanc, M. 2015: Public and common goods in the cultural landscape. Geografski vestnik 87-2. DOI: <https://doi.org/10.3986/gv87203>
- Šmid Hribar, M., Kozina, J., Bole, D., Urbanc, M. 2018: Public goods, common-pool resources, and the commons: The influence of historical legacy on modern perceptions in Slovenia as a transitional society. Urbani izziv 29-1. DOI: <https://doi.org/10.5379/urbani-izziv-en-2018-29-01-004>
- Šmid Hribar, M., Hori, K., Urbanc, M., Saito, O., Zorn, M. 2023: Evolution and new potentials of landscape commons: Insights from Japan and Slovenia. Ecosystem services 59. DOI: <https://doi.org/10.1016/j.ecoser.2022.101499>
- Šmid Hribar, M., Urbanc, M., Zorn, M. 2023: Commons and their contribution to sustaining Slovenian cultural landscapes. Acta geographica Slovenica 63-3. DOI: <https://doi.org/10.3986/AGS.11591>
- Takala, A. J., Arvonen, V., Katko, T. P., Pietilä, P. E., Åkerman, M. W. 2011: The evolving role of water co-operatives in Finland. International Journal of Co-operative Management 5-2.
- Terzi, S., Sušnik, J., Schneiderbauer, S., Torresan, S., Critto, A. 2021: Stochastic system dynamics modelling for climate change water scarcity assessment of a reservoir in the Italian Alps. Natural Hazards and Earth System Sciences 21-11. DOI: <https://doi.org/10.5194/nhess-21-3519-2021>
- Tucker, C. M. 2014: Creating equitable water institutions on disputed land: a Honduran case study. Water International 39-2. DOI: <https://doi.org/10.1080/02508060.2014.888986>
- Tyhotyholo, T., Ncube, B. 2023: The rhetoric of community participation in urban South African water governance. Utilities Policy 82. DOI: <https://doi.org/10.1016/j.jup.2023.101573>
- Urbanc, M., Šmid Hribar, M. 2021: Livek: a mountainous border area's transformation from a ski paradise to a resilient community. Culture and climate resilience: Perspective from Europe. Cham. DOI: https://doi.org/10.1007/978-3-030-58403-0_4
- Uredba o oskrbi s pitno vodo, 2012. Uradni list Republike Slovenije 88/12. Ljubljana.
- Uredba o spremembah Uredbe o seznamih naročnikov, področni zakonodaji skupnosti, seznamih gradenj in storitev, obveznih informacijah v objavah, opisih tehničnih specifikacij in zahtevah, ki jih mora izpolnjevati oprema za elektronsko naročanje. Priloga 3 – Seznam naročnikov v sektorju proizvodnje, transporta ali distribucije pitne vode. Uradni list Republike Slovenije 12/2013. Ljubljana.
- Vilfan, S. 1996: Zgodovinska pravotvornost in Slovenci. Ljubljana.
- Vrzal, J., Ludwig, R., Gampe, D., Ogrinc, N. 2019: Hydrological system behaviour of an alluvial aquifer under climate change. Science of the Total Environment 649. DOI: <https://doi.org/10.1016/j.scitotenv.2018.08.396>
- Water Framework Directive, 2000. EUR LEX, Directive 2000/60/EC. Brussels.
- WRc 2017: European Level Report: Evaluation of the Contribution of Operational Programmes to the Implementation of EU Water Policy. Brussels. Internet: http://ec.europa.eu/environment/water/pdf/EU_overview_report_%20operational_programmes%20.pdf (22. 12. 2022).
- Zadružna pravila vodovodne zadruge Goriče z omejeno odgovornostjo. 1995. Goriče.
- Zakon o zadrugah, 1992. Uradni list Republike Slovenije 13/92. Ljubljana.

COMMONS AND THEIR CONTRIBUTION TO SUSTAINING SLOVENIAN CULTURAL LANDSCAPES

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Grazing communities are key in contributing to sustaining mountain pastures.

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Commons and their contribution to sustaining Slovenian cultural landscapes

ABSTRACT: The main challenge of cultural landscapes is how to manage them, and the concept of commons through collective actions can help in this regard. Based on a questionnaire, 21 collective actions related to cultural landscapes in Slovenia were examined using descriptive statistics. Results show that 1) traditional and transforming commons deal with forests and pastures, whereas new ones are more diverse regarding land use but in significantly smaller areas; 2) new commons indicate possible future mechanism, but they do not (yet) have an impact on cultural landscapes; 3) the main benefits of commons refer to social aspects followed by non-material and regulative benefits; material benefits are ranked last; and 4) new collective actions, especially in urban areas, have difficulties obtaining lands which threatens their existence.

KEY WORDS: commons, new commons, transforming commons, collective actions, nature's contribution to people, cultural landscape, Slovenia

Prispevek skupnega k vzdrževanju slovenskih kulturnih pokrajin

POVZETEK: Glavni izziv kulturnih pokrajin je, kako z njimi upravljati. Pri tem je lahko v pomoč koncept skupnega, ki prek skupnostnih praks upravlja s skupnimi zemljišči. Na podlagi vprašalnika smo z opisno statistiko preučili 21 skupnostnih praks, povezanih s kulturnimi pokrajinami v Sloveniji. Rezultati kažejo, da 1) se tradicionalno in preoblikovano skupno veže na gozdove in pašnike, medtem ko je novo skupno bolj raznoliko glede rabe tal, vendar na bistveno manjših območjih; 2) novo skupno nakazuje možne prihodnje mehanizme, vendar (še) ne vpliva na kulturne pokrajine; 3) glavne koristi skupnega se nanašajo na socialne vidike, sledijo jim nematerialne in uravnalne koristi; materialne koristi so na zadnjem mestu; in 4) nove skupnostne prakse, zlasti v urbanih območjih, imajo težave pri pridobivanju zemljišč, kar ogroža njihov obstoj.

KLJUČNE BESEDE: skupno, skupna zemljišča, novo skupno, preoblikovano skupno, skupnostne prakse, prispevek narave ljudem, kulturna pokrajina, Slovenija

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1 Introduction

The manifestations of the interaction between humankind and its natural environment are manifold and ubiquitous. The cultural landscape is undoubtedly one of the finest, reflecting the characteristics and limits of the natural environment (UNESCO 2019) and socio-cultural features. In the past, land cultivation was generally associated with a high degree of individual and collective responsibility embedded in the everyday practices of larger communities (Petek and Urbanc 2007; Rodela 2012). Such practices created traditional landscapes composed of multiple ecosystems and habitats known for their diversity, dynamics, multi-functionality, and resourcefulness (Šmid Hribar and Urbanc 2016). These last two characteristics of cultural landscapes are particularly relevant in the context of the goods and benefits that people receive from ecosystems, and they are identified as ecosystem services (ES) (Millennium ... 2005) or nature's contributions to people (NCP) (Diaz et al. 2018).

In recent decades, cultural landscapes have faced numerous challenges, most of which are related to a convoluted set of modern social and economic processes. The first among these include population trends in rural areas: rapid aging, depopulation, and increased rural–urban migration (Mauerhofer et al. 2018; Jarzebski et al. 2021), and the second are related to increasingly market-oriented agriculture and trade in agricultural products (Takeuchi, Ichikawa and Elmqvist 2016). In addition, urbanisation has occurred in peri-urban areas (Saito and Ichikawa 2014). The combination of these processes leads either to overgrowth or overuse of agricultural land, both of which result in biodiversity loss (Ribeiro and Šmid Hribar 2019). These sometimes contradictory development trends threaten landscapes in many ways and raise concerns about landscape impoverishment.

One possible option for addressing the challenges posed by the short-term interests of today's world that lead to landscape depletion is through the **concept of commons**. This form of governance is based on »commoners«; that is, people that share a broad set of natural and cultural resources (Anderies and Jansen 2013). Based on several examples worldwide, Ostrom (e.g., 1990; 2005) and several other researchers (e.g., Bromley 1992; McKean 2000; Kissling-Näf, Volken and Bisang 2002; Gatto and Bogataj 2015; Haller et al. 2021) have demonstrated that through collective action communities can govern common-pool resources (CPRs) without resulting in their degradation. Some collective actions of this type have consequently influenced local cultural landscapes (Hrvatini and Perko 2008). In this context, the best-known type of commons in Slovenia are probably agrarian communities (Petek and Urbanc 2007; Rodela 2012; Bogataj and Krč 2014; Premrl et al. 2015; Šmid Hribar, Bole and Urbanc 2015; Šmid Hribar et al. 2018; Bogataj and Krč 2023), which have been under severe threat in recent decades.

Among other studies that directly link commons with landscapes, we highlight a few cases from around the world. Hirahara (2020) and Shimada (2014) examined collective actions in regenerating underused seminatural grasslands and local forests and grasslands in Japan respectively. Duraiappah et al. (2014) suggested that commons could play a role in shared management of ES and biodiversity on private and public lands. Woestenburg (2018) used the concept of the »heathland farm« in the Netherlands as an approach to regenerating traditional and typical cultural landscapes of heathlands with heaths, fields, and meadows, aiming to restore the link between food production and the management of protected natural areas. Haller et al. (2021) investigated Swiss commons and highlighted the role of commoners' organisations in sustainable use of natural resources, the provision of ES, and the management of cultural landscapes. When speaking about cultural landscapes, one should not forget about urban landscapes. Poljak Istenič, Šmid Hribar and Kozina (2023) contributed insights into collective action in an urban community garden in Slovenia that goes beyond the mere production of food, but is perhaps even more important when it comes to creation of urban green areas, socialisation, and community building. Based on a comparative study between Slovenian and Japanese commons, Šmid Hribar et al. (2023) identified different types of commons (e.g., traditional, transforming, and new commons) related to the management of cultural landscapes. However, the implications of commons for cultural landscape governance and management remain understudied. It is still not fully understood how different types of commons affect landscapes and whether there is a way to sustainably maintain and manage landscapes through collective actions in the future.

Therefore, the aim of this study, in which we focus specifically on commons related to cultural landscapes, is to explore how commons can contribute to cultural landscape governance and management through collective actions.

In this study, we understand *commons* as shared resources (mainly common lands) and also as an institution or governance regime behind the collective action; that is, the use of resources (e.g. agrarian communities). These institutions are by some authors called also *commoners' organisations* (Haller et al. 2021). The term *collective actions* is referred to actions taken collectively by members of above mentioned institutions to achieve common objectives. The term *governance* has been used for processes by »... which the repertoire of rules, norms, and strategies that guide behavior within a given realm of policy interactions are formed, applied, interpreted, and reformed. ... A useful shorthand ... is that governance determines who can do what to whom, and on whose authority« (McGinnis 2011, 6). The term *management* refers to all concrete actions performed in physical landscapes. Thus, when referring to arrangement processes, we use the term *governance*, whereas when referring to concrete actions and tasks we use the term *management*.

The objectives of this study are 1) to identify commons and collective actions that help sustain cultural landscapes in Slovenia; 2) to understand which natural resources and landscape elements are associated and managed by collective actions, and whether there are any barriers to doing so, and 3) to identify benefits (i.e., NCPs) of commons and their collective actions for beneficiaries.

2 Methods

2.1 Study area: Slovenia

This study was conducted in Slovenia for several reasons. First, Slovenia has a long tradition of local self-governance, which was introduced as early as the mid-eighteenth century. From the mid-1950s until 1994, it only functioned at the local level (the sub-municipal level) (Kukovič and Brezovšek 2016). During the socialist Yugoslav period (1945–1991), it became necessary for local communities to take the initiative to meet their most urgent needs. The instrument referred to as a »self-imposed contribution« (slv. *samoprispevek*), approved in a referendum, made such implementation possible (Kukovič and Brezovšek 2016). Second, Slovenia has a strong inclination towards participation in non-governmental organisations and clubs (Urbanc, Šmid Hribar and Kumer 2020). Third, Slovenia has a rich tradition of studying commons (Petek and Urbanc 2007; Rodela 2012; Bogataj and Krč 2014; Premrl et al. 2015; Šmid Hribar, Bole and Urbanc 2015; Šmid Hribar et al. 2018) and also of examining new commons and collective actions (Šmid Hribar et al. 2023; Pipan, Šmid Hribar and Urbanc 2023).

Although commons are recognized as a phenomenon in Slovenia and have been studied extensively, there is a lack of available data regarding areas managed by communities. The existing reliable data pertains solely to land owned by agrarian communities, which represent just one form of community ownership. According to Premrl (2013), the total land area owned by agrarian communities is 77,486.47 hectares, corresponding to approximately 3.67% of Slovenia's territory.

2.2 Selection of collective actions

Similar to a study by Šmid Hribar et al. (2023), we focused on different types of collective actions and not on all possible cases. In doing so, we sought to obtain comprehensive results and broad insights into the topic. Therefore, from the list of Slovenian commons (Šmid Hribar et al. 2023) we first singled out those types of commons (sixteen in total) that had a connection to the landscape or at least to landscape elements while implementing collective actions. In addition, based on improved knowledge not taken into account in the previously mentioned study, we added five new cases: the Božca grazing community (no. 3 in Table 2; grazing community differ slightly from agrarian communities, and their collective action is on common pastures), the Goriče Water Cooperative (no. 9; a traditional water cooperative), the Krater Creative Laboratory (no. 18; an urban green space created from degraded land), the Škocjan Lagoon Nature Reserve (no. 19; an example of a collective action forming a protected area), and Mountain hiking trails (no. 21; referring to freely accessible paths across Slovenian landscapes). The final pool consists of twenty-one types of collective actions (Table 2).

Table 1: Set of variables used in the questionnaire.

Group	Variables
A. Basic information	Name; Brief description; Number of members (2022); Basic activities; Initiators of collective actions and their purpose; Achievements of the objectives; Type of environment (rural, suburban, urban); Exact location; Level (local, regional, national); Starting year
B. Natural resources	Natural resource(s) (water, forest, pastures, etc.); Size (2022) of the resource
C. Benefits	Benefits (from the list of NCPs): climate regulation, fresh water regulation, food and feed, learning and inspiration, social benefits, shared norms and values, etc.; Measures to maintain and regulate the environment; Beneficiaries (local residents, tourists, administrative bodies, etc.); Action taken to manage regulating NCP (managing forests, planting trees, planting bee forage, etc.)
D. Ownership	Owner of the resource (individual/private owner, administrative authority, company, etc.)
E. Changes	Changes of activities over recent decades and reasons for them

2.3 Data collection

We created a data-collection questionnaire with a set of variables formulated as questions of two basic types: 1) open questions (free response) and 2) closed questions (three types: yes/no questions, multiple-choices questions with predefined categories, and open-choice questions) (see Table 1).

The data were collected through telephone and online interviews with the collective action representatives in September and October 2022. Altogether, nineteen interviews were carried out. Data for two actions (no. 2 and no. 16) were acquired from study Šmid Hribar et al. (2023).

2.4 Data analysis

After data collection basic descriptive statistics was performed with the survey tool *IKA*. For further numerical analyses Microsoft Excel was used. Comparisons between two variables were analysed using cross tabulations. For quantitative analysis data in open-ended questions were categorised and converted into numerical values.

In addition, we attributed data on the type of origin of collective actions: if they were established prior to Slovenian independence in 1991, they were understood as traditional or transforming; if they were established after 1991 but based on an earlier origin, they could also be treated as traditional or transforming. The label *transforming* was assigned to those cases that evolved significantly in their functioning (such as the manner of sharing profit, investing in the local community, and similar). If practices were established after 1991 with no prior origin, they were treated as new.

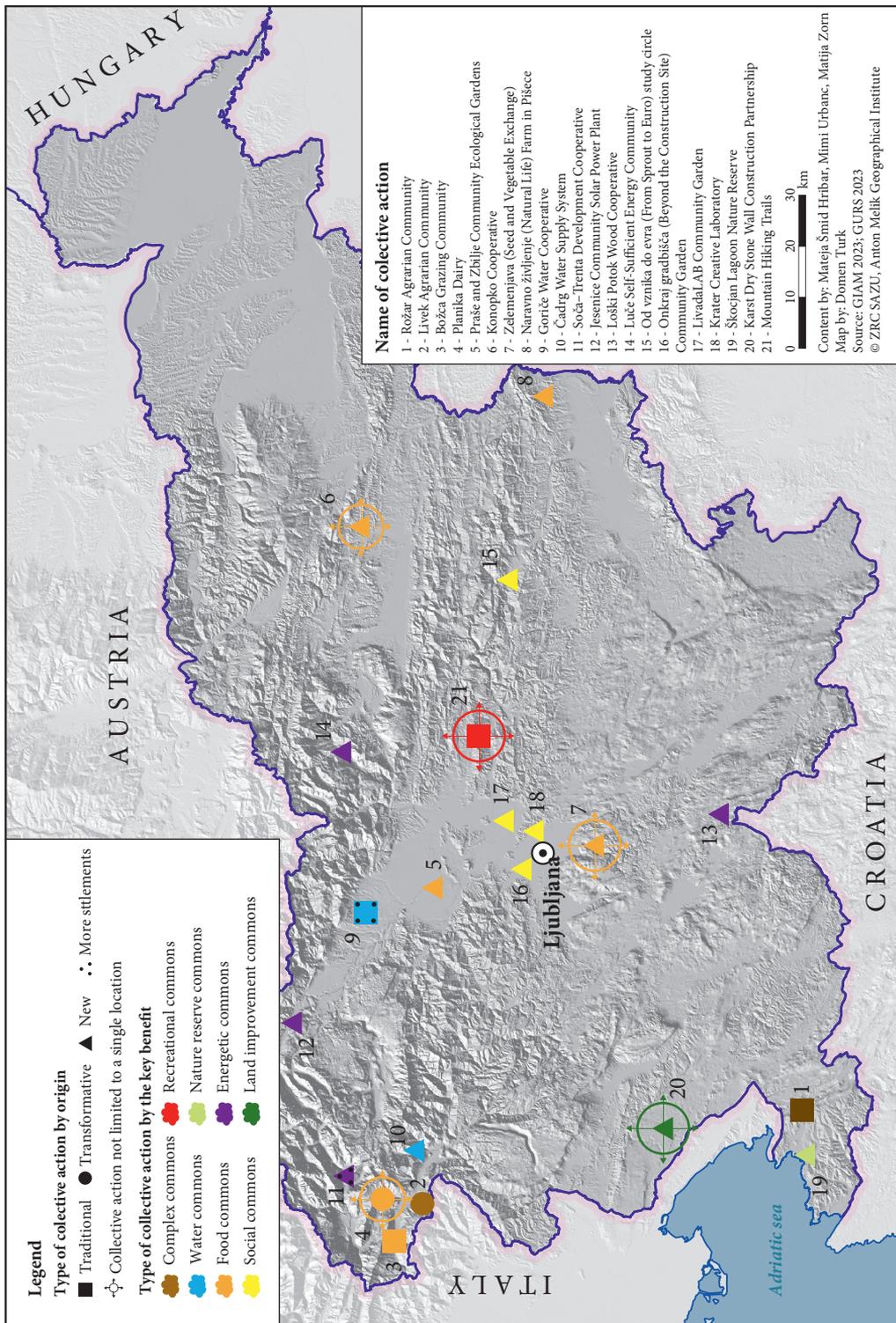
3 Results

3.1 Collective actions that help sustain cultural landscapes in Slovenia

In terms of their key benefits, landscape-related collective actions were divided into the following categories of commons:

- Food commons (grazing associations, community gardens, farms, seed and vegetable exchanges);
- Water commons (water cooperatives);
- Energy commons (energy communities and development cooperatives that supply electricity and heat);
- Recreational commons (hiking trails that provide access to and movement through the natural landscape);
- Land improvement commons (dry stone walls that improve other land);
- Nature reserve commons (a patchwork of habitats);
- Social commons (community gardens and green areas, whose primary focus is on educating and empowering individuals);
- Multi-benefit/complex commons (forests with a wide variety of benefits).

Figure 1: Landscape-related collective actions and their commons in Slovenia in terms of their key benefits and time of establishment. ► p. 106



In 2022, twenty-one types of collective actions with a direct or indirect impact on the cultural landscape were identified in Slovenia and thus selected for the analysis (Table 2, Figure 1). Of these, four are traditional (related to agrarian and grazing communities), fifteen are new (they include a wider range of activities, with food provision being predominant), and two are transforming. With the exception of four, all these collective actions were established after Slovenia's independence in 1991. Regarding collective actions we have to note that both types of agrarian communities (traditional and transforming) have originated already from before the Second World War, after which they were dissolved, to be re-established after the independence in 1991. Over half (twelve) of the collective actions were established in or after 2010, when the first one was also introduced in the urban environment. Among the new collective actions, four are in urban areas, nine are in rural areas, and two have a mixed urban-rural character (they involve the exchange of crops and seeds between members, and the production and processing of crops and products). As a rule, the traditional and transforming collective actions are present in rural areas, even though there is also one isolated case of a traditional urban collective action in Slovenia: the Kamnik Urban Citizen Cooperation (Deisinger 2012). The new collective actions arose individually; only in 2011, 2013, and 2014 two were established each year.

The motives for establishing collective actions vary, but they are mostly practical. The traditional and transforming ones largely have to do with an inherited legacy that the current community members are governing out of economic interests (e.g., agrarian communities no. 1 and no. 2 in Table 2, and grazing community no. 3) or with the organization of a collective production for selling one's own products (a dairy, no. 4). New collective actions are being established to improve urban degraded areas (no. 18), educate and encourage people to actively participate in the environment (some community gardens and green areas, such as no. 16, no. 17, and no. 18), use one's own example to show how healthy food can be produced (no. 5 and no. 8), or in some cases also how food can be produced and sold collectively (a community rural farm, no. 8, a cooperative, no. 6), preserve and protect habitats (no. 19), supply energy and heat (energy cooperatives, no. 11, no. 12, no. 13, and no.14), provide safe drinking water (water cooperatives, no. 9 and no. 10), promote rural development (certain energy cooperatives, no. 11 and no. 13), or to restore landscape elements, strengthen awareness of the importance of dry stone wall construction, and transfer knowledge (dry stone walls, no. 20).

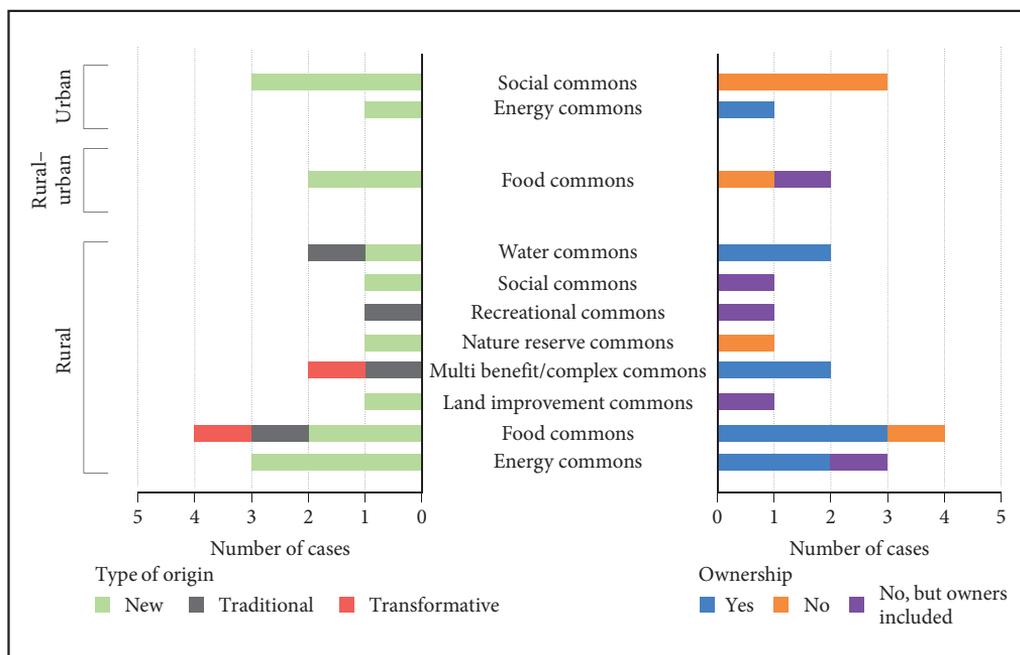


Figure 2: The main categories of commons by type of origin, ownership, and type of environment.

Table 2: Selected collective actions related to Slovenian cultural landscapes in 2022.

No.	Name of collective action	Year of establishment	Type of environment	Origin	Key benefits	No. of members	Natural resource / landscape element governed as commons
1	Rožar Agrarian Community	1994	Rural	Traditional	Multi-benefit/complex commons	70	Forest (210 ha), Meadow and pasture (to a smaller extent)
2	Livek Agrarian Community	1996	Rural	Transforming	Multi-benefit/complex commons	96	Forest (500 ha), Alpine pasture (33,3 ha), Pasture (to a smaller extent)
3	Božča Grazing Community	1984	Rural	Traditional	Food commons	7	Pasture (73 ha)
4	Planika Dairy	1975	Rural	Transforming	Food commons	209 farmers (owners)	Pasture (100 ha) ¹
5	Praše and Zbilje Community	2011	Rural	New	Food commons	100	Meadow (0.31 ha), Ecological Gardens, Garden (0.26 ha), Orchard (0.13 ha)
6	Konopko Cooperative	2013	Rural—urban	New	Food commons	About 100	Arable field ²
7	Seed and Vegetable Exchange	2014	Rural—urban	New	Food commons	20–40	Garden (indirectly) ³
8	Natural Life Farm in Pišce	2017	Rural	New	Food commons	20–30	Meadow (4 ha), Garden (0.28 ha), Orchard (1.32 ha)
9	Goriče Water Cooperative	1938	Rural	Traditional	Water commons	248	Water (150,000 m ³ of water for households and cattle per year; 250 households)
10	Čadrg Water Supply System	2011	Rural	New	Water commons	46	Water (3,650 m ³ of water per year; 24 households)
11	Soča-Trenta Development Cooperative	1992	Rural	New	Energy commons	48	Water
12	Jesenice Community Solar Power Plant	2013	Urban	New	Energy commons	55–62	Sun (1 structure; 33 housing units)
13	Loški Potok Wood Cooperative	2016	Rural	New	Energy commons	23	Forest ⁴
14	Luče Self-Sufficient Energy Community	2018	Rural	New	Energy commons	35 (metering points)	Sun (9 structures)
15	From Sprout to Euro Study Circle	2000	Rural	New	Social commons	5–12	Forest (500 ha), Meadow (2 ha), Rocks (20 ha)
16	Beyond the Construction Site Community Garden	2010	Urban	New	Social commons	80	Garden (0.1 ha)

No.	Name of collective action	Year of establishment	Type of environment	Origin	Key benefits	No. of members	Natural resource / landscape element governed as commons
17	LivadalAB Community Garden	2014	Urban	New	Social commons	15	Meadow (0.14 ha), Green area (0.18 ha), Garden (0.02 ha)
18	Krater Creative Laboratory	2020	Urban	New	Social commons	6	Green area with trees (1.6 ha), Small mushroom garden
19	Škocjan Lagoon Nature Reserve	1998	Rural	New	Nature reserve commons	10	Brackish lagoon (122.7 ha), Meadow, pasture, sea, water areas
20	Karst Dry Stone Wall Construction Partnership	2015	Rural	New	Landscape improvement commons	70	Dry stone walls (estimated at 11,725 km; density: 3.2 km/km ²) ⁵
21	Mountain Hiking Trails	1874	Rural	Traditional	Recreational commons	1,200	Hiking trails (10,000 km; density: 0.5 km/km ²) ⁶

¹ There are no data on the amount of grazing land owned by farmers from whom the dairy buys milk.

² The minimum area per member is 1 ha.

³ *Zelmezijava* directly administers only the digital platform, but it indirectly influences gardens via its members.

⁴ They do not have shared forest ownership, but each owner contributes biomass from his private forest.

⁵ Extending across meadows, pastures, and forests and surrounding arable fields, gardens, and water reservoirs in twenty-one municipalities in western and southwestern Slovenia.

⁶ Running through meadows, pastures, forests, green areas, and rocks across the entire country.

3.2 Relations between collective actions and landscape elements

The following landscape elements and natural resources are directly or indirectly managed as part of collective actions (Figure 3; the order is based on frequency): meadows, gardens, pastures, and forests (most actions), water resources, orchards, and green areas or trees (some actions, to a minor extent), and arable fields, rocks, brackish water, and the sea (in rare individual actions). The use of solar energy stands out among the new collective actions. The ranking of landscape elements per area is somewhat different (Table 2 the most right column): forests account for the largest share, followed by (alpine) pastures; other resources and landscape elements, which are usually related to new actions, cover significantly smaller areas. The most frequently represented urban landscape elements include gardens, followed by green areas and the sun; all other natural resources and landscape elements except green areas with trees are represented in rural areas. Most landscape elements are areal units (e.g., forests) of varying size, but some of them are linear (e.g., dry stone walls).

Two-thirds (i.e., fourteen) of the collective actions include special measures to maintain balance and a healthy environment. These measures do not provide any special benefits, but they affect the individual's or social wellbeing (among them, planting bee shrubs and trees predominate).

Activities have a direct and indirect impact on landscapes, and most collective actions perform both (Figure 4). Among the first, activities connected with land management and cultivation stand out, such as timber harvesting or vegetable growing. Among the indirect activities, all kinds of events, training organisation, and knowledge transfer are most pronounced. In this group, activities that provide basic services for everyday life stand out as well; for instance, keeping a local shop or post office, or supplying electricity.

Direct impacts refer to the immediate and visible changes that occur to the landscape, for instance garden cultivation. Indirect impacts may not be immediately visible, but can still have significant consequences through behaviour changes, for instance learning.

The members of rural collective actions, regardless of their type of origin, are also largely the owners of the natural resources and landscape elements that they govern (no. 1, no. 2, no. 3, no. 4, no. 8, no. 9,

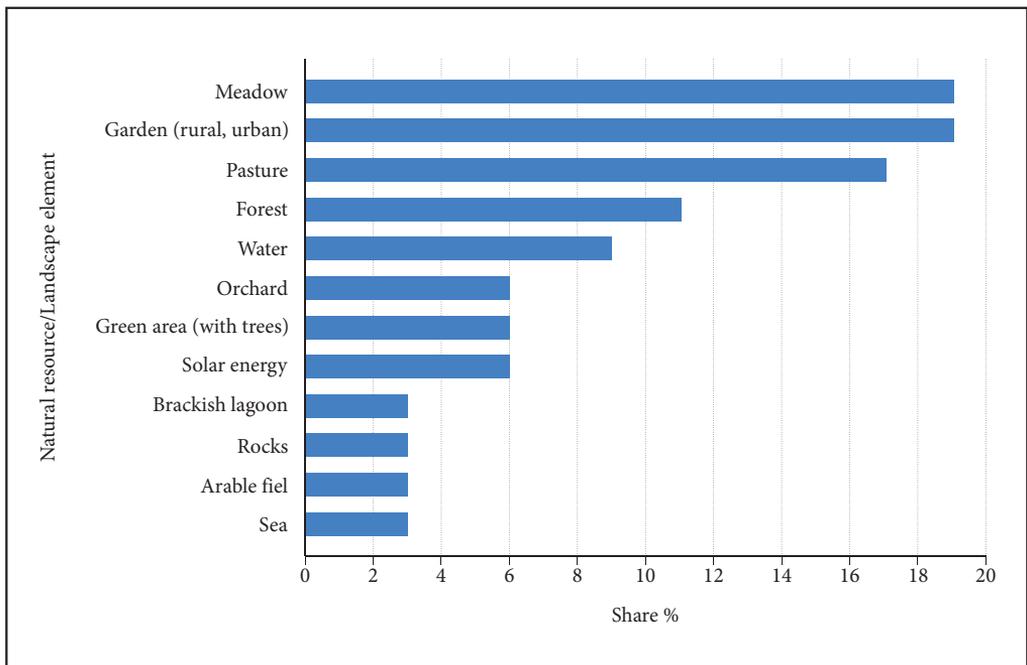


Figure 3: Share (%) of natural resources and landscape elements listed by relative frequency.



Figure 4: Cloud tags generated with a WordArt tool from keywords associated with activities performed by collective actions that have a direct (left) and indirect (right) impact on landscapes.

no. 10, no. 11, and no. 14; Figure 2). The only exceptions are the wood cooperative (no. 13, where only the cooperative is jointly owned, whereas the wood is contributed by individual forest owners), the nature reserve (no. 19), and the two community gardens (no. 5). The situation is significantly different with urban collective actions, which are all new and in which the resources are not owned but leased; the only exception is the Jesenice Community Solar Power Plant, in which homeowners are involved (no. 12).

For five collective actions, the ownership could not be unambiguously defined because only the infrastructure was collective and not also the resource (no. 6, no. 14, and no. 15), or the collective action is widely presented in Slovenia and owners are only indirectly involved in it (e.g., maintaining dry stone walls included in no. 20 and hiking trails in no. 21).

3.3 Benefits provided by commons for users and other beneficiaries

Even though collective actions and their commons are usually established based on a tangible need (see the motives under Section 3.1), the results (Figure 5) show that social benefits are by far the most prevalent, which practically all types of commons contribute to. Among these benefits, enhancing trust and reciprocity stands out the most. In terms of importance, this is followed by non-material benefits, especially learning and inspiration, and strengthening collective identity. These, too, are largely contributed to by all types of commons. Regulative benefits, which follow in terms of importance and, among which, habitat creation and maintenance, and the regulation of air quality and climate predominate, are importantly contributed to by the social commons, nature reserve commons, and multi-benefit/complex commons. The last two types manage sustainable landscape elements with minimal intervention, whereas social commons introduce the natural environment into urban space. This group of benefits is also contributed by food commons, which are the most heterogeneous type of commons from the viewpoint of natural resources (pastures, meadows, orchards, arable fields, and gardens).

Collective actions through their commons provide various benefits not only to their members, but also other beneficiaries, especially locals in general, organized groups, administrative bodies, society in general, and, to a smaller extent, tourists or visitors and, almost insignificantly, to protected area managers (Figure 5). From a spatial perspective, rural commons also provide benefits to tourists or visitors and protected area managers, whereas urban commons do not provide any benefits to these stakeholders.

No	Name of collective action	Type of origin		Geographical area		Beneficiaries/users						Nature's Contribution to People (NCP)										Social contribution																	
		Traditional	Transforming	Rural	Urban	Rural - Urban	Local residents	Organized groups (e.g. NGOs)	Government administrative bodies	Tourists/visitors	Society (general public)	Protected area manager	Habitat creation and maintenance	Pollination ...	Regulation of air quality	Regulation of climate	Regulation of freshwater quantity ...	Regulation of freshwater ... Quality	Formation, ... of soils and sediments	Regulation of hazards ...	Regulation of detrimental ...	Energy	Food and feed	Materials, companionship and labour	Medicinal, biochemical and ...	Learning and inspiration	Physical and psychological experiences	Supporting identities	Maintenance of options	Social networks	Trust and reciprocity	Shared norms and values							
Multi benefit / complex commons																																							
1	Rožar Agrarian community	x		x			x	x	x	x		x		x	x	x		x				x	x			x	x	x			x	x							
2	Livék Agrarian community		x		x		x	x	x		x			x	x	x		x	x			x	x	x		x	x	x			x	x	x						
Food commons																																							
3	Božca Grazing community	x			x		x		x	x	x		x								x		x			x							x	x					
4	Planika Dairy		x		x		x	x	x	x	x		x		x	x							x			x	x	x				x	x	x					
5	Praše and Zbilje Community Eco. Gardens			x	x		x	x		x	x		x	x	x	x	x	x		x			x	x		x	x		x			x	x	x					
6	Konopko Cooperative		x			x	x	x	x		x		x	x			x	x					x	x	x	x	x	x	x	x	x	x	x	x	x				
7	Seed and Vegetable Exchange		x			x	x	x		x	x		x	x	x	x		x				x		x	x	x	x		x					x	x	x			
8	Natural Life Farm in Pišce			x	x		x	x	x	x	x		x	x	x	x	x	x	x			x	x	x		x	x								x	x			
Water commons																																							
9	Goriče Water Cooperative	x			x		x	x																									x	x	x				
10	Čadrg Water Supply System			x	x		x			x								x																	x	x			
Energy commons																																							
11	Soča-Trenta Development Cooperative		x	x			x	x	x	x	x		x	x	x	x	x	x	x	x	x		x			x		x	x				x	x	x	x			
12	Jesene Community Solar Power Plant		x		x		x		x		x			x	x								x				x								x	x			
13	Loški Potok Wood Cooperative		x	x			x	x	x					x	x												x								x	x	x		
14	Luče Self-Sufficient Energy Community		x	x			x	x	x	x	x		x		x												x									x	x	x	
Social commons																																							
15	From Sprout to Euro study circle		x	x			x	x	x	x	x		x	x	x		x	x	x	x	x		x			x		x	x							x	x	x	
16	Beyond the Construction Site Community Garden		x		x		x	x	x		x			x	x	x							x			x	x	x	x	x	x	x	x	x	x	x	x	x	
17	LivadaLAB Community Garden		x		x		x	x	x		x			x	x	x	x	x	x	x	x		x			x	x	x	x	x	x	x	x	x	x	x	x	x	
18	Krater Creative Laboratory		x		x		x	x	x	x	x		x	x													x	x	x	x	x	x	x	x	x	x	x	x	
Nature reserve commons																																							
19	Škocjan Lagoon Nature Reserve			x	x		x	x	x	x	x		x	x	x	x	x	x	x	x	x		x			x		x	x							x	x	x	
Land improvement commons																																							
20	Karst Dry Stone Wall Construction Partnership			x	x		x	x	x	x	x		x														x		x	x							x	x	x
Recreational commons																																							
21	Mountain hiking trails	x			x		x	x	x	x	x		x																								x	x	x

Figure 5: Benefits contributed by collective actions and their commons. Light gray indicates the type of origin, dark gray the geographical area, orange the beneficiaries, green the regulative benefits, yellow the material benefits, light blue the non-material benefits, and blue the social benefits.

4 Discussion

The study revealed that urban areas only contain food, energy, and social commons, and that other types of commons are related to the rural areas (Figure 5). In addition, it found two types of food commons (no. 6 and no. 7) that combine urban and rural areas. Hence, this study advances current literature by identifying rural, urban, and rural–urban differentiation of commons. Furthermore, typical traditional and transforming collective actions involve the multi-benefit/complex commons, food commons, water commons, and land improvement commons, and typical new collective actions involve the energy commons, social commons, and nature reserve commons. New collective actions are more flexible and react faster to the current situation in society, which fully agrees with the findings in the literature (Tornaghi 2012). Some traditional actions have also revealed themselves in a new light. One of these is the recreational commons, which refers to hiking trails (Stritar 2020). This involves an important collective action, which, through freely accessible trails, makes it possible for the general public to traverse practically the entire country. Nevertheless, so far it has never been considered in the light of the commons.

The Krater Creative Laboratory stands out among the urban collective actions (<https://krater.si/>; no. 18). It uses a degraded or overgrown urban area (such land was also used for the Beyond the Construction Site Community Garden; no. 16) (Jurman and Lovšin 2021) to study ecological processes. This is a type of outdoor lab or test area for various experiments at the nexus of culture and ecology. The analysis of urban commons showed that most likely their key role is primarily in providing urban residents a place for establishing contact with nature, education, experimenting, and socializing. Because the new commoners usually manage urban space sustainably, at the same time they contribute to biodiversity in the urban areas, which is in agreement with Duraiappah et al. (2014) and their statement about the positive impact of co-management on biodiversity.

Ownership is another important aspect highlighted here. In principle, new commons are more heterogeneous in this regard. Especially in urban areas, managers own barely any natural resources or landscape elements. They pay insufficient attention to this or are not sufficiently heard by the city's decision-makers. During the study, in October 2022, the Beyond the Construction Site Community Garden (no. 16) had to shut down because the owner, the City of Ljubljana, decided to build public rental housing on that site. On the other hand, the purchase of forest for forest-dwelling bird species can be highlighted as a future best practice (this common is only in the making, which is why it was not included on the list). In 2022, the Slovenian Bird Watching and Bird Study Association (DOPPS) raised EUR 45,000 to purchase a forest that will be left to develop naturally, thus providing a habitat for endangered bird species (see <https://www.gozdnispecialisti.si/>). This demonstrates that the DOPPS is aware of the impact of ownership on natural resource management.

Food commons are the most important from the viewpoint of sustaining cultural landscapes, which is hardly surprising. Agriculture, which underpins food commons, is widely acknowledged as the sector with the most extensive impact on landscape development (Kristensen 2016). Food commons also considerably contribute to biodiversity, which is additionally supported by nature reserve commons, land improvement commons, and multi-benefit/complex commons. The importance of multi-benefit commons, in particular agrarian communities, for landscapes and landscape-related issues has been well established in the literature (Ledinek Lozej 2013; Šmid Hribar, Bole and Urbanc 2015; Urbanc, Ledinek Lozej and Šmid Hribar in press). The potential abandonment of common grazing in mountain pastures (no. 3) will endanger these pastures, which are already becoming heavily overgrown. It is anticipated that in the future the appearance of the rural cultural landscape could be changed the most by the energy commons; for example, if solar power plants spread from roofs in the built environment to farmland. This will become especially evident if it is accompanied by the abandonment of agriculture on the one hand and its intensification on the other. Transition from the agricultural sector to the energy sector – in particular, photovoltaic plants developed on rural land – is widely considered to contribute (at least indirectly) to various forms of environmental degradation (Delfanti et al. 2016). Paradoxically, energy commons, as long as they are small, build the local community and act as a cohesive bond. As soon as the economies of scale change, or as energy infrastructure spreads to green spaces, energy commons will have a major impact on the appearance of the rural landscape. In turn, social commons are important in the urban environment because they provide or sustain small natural areas in cities.

It was found that two types of commons (no. 20 and no. 21) have a linear shape, and they therefore play a different role in the landscape. Dry Stone Walls, a remnant of past agricultural activities, are the best example of human adaptation to the natural environment (Šmid Hribar and Urbanc 2022); they provide spatial organisation, diversity, and wind/erosion protection. Collective action no. 20 was created to preserve cultural heritage values. Mountain Hiking Trails (no. 21), the only country-wide commons, also have a long tradition but are maintained for practical reasons. Offering access to numerous hills and mountains, they have made the nationally popular leisure activity of hiking possible.

Collective actions are important not only for the management or maintenance of resources, but also for the processes involved. The cultural landscape is much more than a form; it is also, and above all, a process of dynamic interaction between people and their environment (Urbanc, Fridl and Resnik Planinc 2021). In this respect, the connection between collective actions and landscapes is most intense when it comes to activities. This study clearly supports the idea that the collective actions studied are very activity-based (Figure 4). Collective actions have an explicitly distinct dynamic aspect, much like the landscape.

Furthermore, collective actions have a wide range of impacts, both direct and indirect, and in most cases a combination of both. We cannot favour one over the other. It is likely that in the future some indirect activities will become direct, such as the impact of energy commons. As solar installations spread on agricultural land, their impacts will become direct impacts. As for impacts, multiplier effects should also be highlighted. One such example is the Planika Dairy (no. 4), which directly cultivates only its own farm, but indirectly supports the management of hundreds of hectares of farmland in less-favourable mountain areas through milk purchases. Without solid land management support from the dairy to the owners, it is anticipated that many parts of the Soča Valley Region would be subject to land abandonment and consequent natural succession.

The most diverse benefits are provided by food and social commons, and the least diverse are provided by water commons. Energy and water stand out among the material benefits, for which Figure 5 paradoxically suggests they are the least important. As expected, most of material benefits are provided by the food, water, and multi-benefit/complex commons, which are largely found in the rural areas and are more traditional. Historically, the commons arose precisely from the need for additional food resources (pastures) and energy (firewood) (Petek and Urbanc 2007), but the findings of this study demonstrate that contemporary collective actions with their commons are also established to meet other needs. This is also confirmed by Section 3.3, which examines the contribution of commons to various types of benefits. Based on Figure 5, it seems that most regulative benefits are contributed precisely by new commons. However, because traditional and transforming commons govern and manage the largest landscape elements in terms of area covered (i.e., forests and pastures), they ultimately contribute the most regulative benefits.

4.1 Policy recommendations

Due to the extremely small areas they manage, the new commons (especially the urban and urban-rural ones) do not (yet) have an impact on sustaining cultural landscapes. However, the collective actions studies indicate how, through them, communities could influence the governance of specific, more natural, landscape elements. The findings of this study could be useful for agricultural, nature-conservation, and spatial-policy decision-makers. The traditional and transforming collective actions (especially agrarian and grazing communities) are key in contributing to sustaining mountain pastures and governing forests; without them, alpine pastures are under serious threat of being overgrown, which has already been demonstrated by Urbanc, Ledinek Lozej and Šmid Hribar (in press). Therefore, agricultural decision-makers should encourage the continuation of these types of collective actions (through simplified administrative procedures, tax relief, and financial incentives). Furthermore, the mechanism established by the DOPPS may be of interest to the nature-conservation policy. It is presented in the Škocjan Lagoon Nature Reserve (no. 19), and it illustrates an alternative approach to protecting a patchwork of more natural landscape elements that serve as habitats for endangered species and are connected into reserves. The DOPPS has already applied this mechanism to three sites (in addition to the Škocjan Lagoon Nature Reserve, to the Ig Marsh Nature Reserve and the Ormož Lagoons Nature Reserve; see <https://www.ptice.si>), and it should also be expanded to other sites. Spatial and nature-conservation decision-makers should take into account the value that community gardens, orchards, meadows, and green areas provide to both the urban and rural environments;

this mechanism helps educate people, provide information about growing healthy food, understand ecological processes, and preserve biodiversity.

5 Conclusion

This study showed that three types of collective actions and their commons can be distinguished in Slovenia in terms of origin: traditional, transforming, and new commons. Traditional and transforming commons largely deal with large areas of forests and alpine pastures, whereas new ones are oriented toward more diverse land use, such as meadows, gardens, orchards, rocks, arable fields, and even brackish lagoons, but in significantly smaller areas. They indicate possible future paths or a mechanism that may be used by decision-makers in the future, but, unlike the other two types, they do not (yet) have an impact on the current cultural landscape.

General understanding was that the main motive to establish most commons was practical in nature (natural resource management and the supply of certain goods). However, the questionnaire, in which the representatives of studied commons could reflect on their actions through a series of benefits they might have not even thought about before, demonstrated that the main benefits refer to social aspects, especially trust and reciprocity between members. This was followed by non-material benefits, especially learning and inspiration, and regulative benefits, such as habitat creation and maintenance, and the regulation of air quality and climate. Material benefits, which mainly come in the form of food, water, and energy, are ranked last. This suggests that today people do not form commons to gain material benefits, which was the main motive in the past, but, first and foremost, to strengthen their social ties and realize non-material aspects, while also recognizing the importance of these types of commons for maintaining or even improving their living environment.

Last but not least, this study also revealed that new commons, especially in urban areas, have difficulties obtaining their own natural resources. This makes governance very difficult, which is why decision-makers should help out (e.g., with free or favorable long-term leases). It seems that many new urban commoners are insufficiently aware that it is only ownership or at least some kind of management right that facilitates decision-making and long-term existence. Through networking, new commons could learn from the traditional and especially the transforming ones because they have rich experiences (good and bad) in governance issues. The findings of this study should be used by agricultural, nature-conservation, and spatial decision-makers in formulating future initiatives and financial incentives for managing and sustaining cultural landscapes, nature reserves, and urban green areas, and for preserving biodiversity.

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6 References

- Anderies, J. M., Janssen, M. A. 2013: Sustaining the commons. Internet: <http://sustainingthecommons.asu.edu/wp-content/uploads/2013/07/Sustaining-the-Commons-v101.pdf> (1. 3. 2015).
- Bogataj, N., Krč, J. 2014: A forest commons revival in Slovenia. *Society and Natural Resources* 27-8. DOI: <https://doi.org/10.1080/08941920.2014.918225>
- Bogataj, N., Krč, J. 2023: Towards the efficient response of forest owners to large-scale forest damage: An example of forest commons. *Acta geographica Slovenica* 63-3. DOI: <https://doi.org/10.3986/AGS.11084>
- Bromley, D. V. 1992: *Making the Commons Work: Theory, Practice, Policy*. San Francisco.
- Deisinger, M. 2012: *Po poteh dediščine meščanske korporacije*. Kamnik.
- Delfanti, L., Colantoni, A., Recanatesi, F., Bencardino, M., Sateriano, A., Zambon, I., Salvati, L. 2016: Solar plants, environmental degradation and local socioeconomic contexts: A case study in a Mediterranean country. *Environmental Impact Assessment Review* 61. DOI: <https://doi.org/10.1016/j.eiar.2016.07.003>

- Díaz, S., Pascual, U., Stenseke, M., Martín-López, B., Watson, R. T., Molnár, Z., Hill, R., Chan, K. M. A., Baste, I. A., Brauman, K. A., Polasky, S., Church, A., Lonsdale, M., Larigauderie, A., Leadley, P. W., van Oudenhoven, A. P. E., van der Plaats, F., Schröter, M., Lavorel, S., Aumeeruddy-Thomas, Y., Bukvareva, E., Davies, K., Demissew, S., Erpul, G., Failler, P., Guerra, C. A., Hewitt, C. L., Keune, H., Lindley, S., Shirayama, Y. 2018: Assessing nature's contributions to people. *Science* 359(6373). DOI: <https://doi.org/10.1126/science.aap8826>.
- Duraiappah, A. K., Asah, S. T., Brondizio, E. S., Kosoy, N., O'Farrell, P. J., Prieur-Richard, A.-H., Subramanian, S. M., Takeuchi, K. 2014: Managing the mismatches to provide ecosystem services for human well-being: A conceptual framework for understanding the new commons. *Current Opinion in Environmental Sustainability* 7. DOI: <https://doi.org/10.1016/j.cosust.2013.11.031>
- Gatto, P., Bogataj, N. 2015: Disturbances, robustness and adaptation in forest commons: Comparative insights from two cases in the South-eastern Alps. *Forest Policy and Economics* 58. DOI: <https://doi.org/10.1016/j.forpol.2015.03.011>
- Haller, T., Bertogliati, M., Liechti, K., Stuber, M., Viallon F.-X., Wunderli, R. 2021: Transformation and diversity: Synthesis of the case studies. *Balancing the Commons in Switzerland: Institutional Transformations and Sustainable Innovations*. London. DOI: <https://doi.org/10.4324/9781003043263-13>
- Hirahara, S. 2020: Regeneration of underused natural resources by collaboration between urban and rural residents: A case study in Fujiwara district, Japan. *International Journal of the Commons* 14-1. DOI: <https://doi.org/10.5334/ijc.977>
- Hrvatin, M., Perko, D. 2008: Landscape characteristics of common land in Slovenia. *Acta geographica Slovenica* 48-1. DOI: <https://doi.org/10.3986/AGS48101>
- Jarzebski, M. P., Elmqvist, T., Gasparatos, A., Fukushi, K., Eckersten, S., Haase, D., Goodness, J., Khoshkar, S., Saito, O., Takeuchi, K., Theorell, T., Dong, N., Kasuga, F., Watanabe, R., Sioen, G. B., Yokohari, M., Pu, J. 2021: Ageing and population shrinking: Implications for sustainability in the urban century. *npj Urban Sustainability* 1. DOI: <https://doi.org/10.1038/s42949-021-00023-z>
- Jurman, U., Lovšin, P. 2021: Onkraj vrtničkov: skupnostni vrt Onkraj gradbišča. Ljubljana.
- Kissling-Näf, I., Volken, T., Bisang, K. 2002: Common property and natural resources in the Alps: The decay of management structures? *Forest Policy and Economics* 4-2. DOI: [https://doi.org/10.1016/S1389-9341\(02\)00013-8](https://doi.org/10.1016/S1389-9341(02)00013-8)
- Kristensen, S. B. P. 2016: Agriculture and landscape interaction – landowners' decision-making and drivers of land use change in rural Europe. *Land Use Policy* 57. DOI: <https://doi.org/10.1016/j.landusepol.2016.05.025>
- Kukovič, S., Brezovšek, M. 2016: The development of local government in Slovenia. *Democratisation Processes in Poland and Slovenia: comparative study*. Maribor.
- Ledinek Lozej, Š. 2013: Paša in predelava mleka v planinah Triglavskega narodnega parka: kulturna dediščina in aktualna vprašanja. *Traditiones* 42-2. DOI: <https://doi.org/10.3986/Traditio2013420203>
- Mauerhofer, V., Ichinose, T., Blackwell, B. D., Willig, M. R., Flint, C. G., Krause, M. S., Penker, M. 2018: Underuse of social-ecological systems: A research agenda for addressing challenges to biocultural diversity. *Land Use Policy* 72. DOI: <https://doi.org/10.1016/j.landusepol.2017.12.003>
- McGinnis, M. 2011: An introduction to IAD and the language of the Ostrom Workshop: A simple guide to a complex framework. *Policy Studies Journal* 39-1. DOI: <https://doi.org/10.1111/j.1541-0072.2010.00401.x>
- McKean, M. A. 2000: *Common property: What is it, what is it good for, and what makes it work? People and Forests: Communities, Institutions, and Governance*. Cambridge.
- Millennium Ecosystem Assessment – MEA, 2005: *Ecosystems and human well-being: synthesis*. Washington, DC.
- Ostrom, E. 1990: *The governing of commons: The evolution of institutions for collective action*. Cambridge. DOI: <https://doi.org/10.1017/CBO9780511807763>
- Ostrom, E. 2005: *Understanding institutional diversity*. New Jersey. DOI: <https://doi.org/10.2307/j.ctt7s7wm>
- Petek, F., Urbanc, M. 2007: Skupna zemljišča v Sloveniji. *Geografski vestnik* 79-2.
- Pipan, P., Šmid Hribar, M., Urbanc, M. 2023: Motivation, robustness and benefits of water commons: Insights from small drinking water supply systems. *Acta geographica Slovenica* 63-3. DOI: <https://doi.org/10.3986/AGS.11592>
- Poljak Istenič, S., Šmid Hribar, M., Kozina, J. 2023: Nexus of urban gardening and social sustainability in post-socialist cities. *Urban Agriculture and Regional Food Systems: Building Resilient Food Systems*. London. DOI: <https://doi.org/10.1016/B978-0-12-820286-9.00013-3>

- Premrl, T. 2013: Analiza stanja agrarnih skupnosti v Sloveniji na podlagi podatkov upravnih enot. Ekspertiza, Gozdarski inštitut Slovenije. Ljubljana. Gozdarski inštitut Slovenije. Ljubljana.
- Premrl, T., Udovč, A., Bogataj, N., Krč, J. 2015: From restitution to revival: A case of commons re-establishment and restitution in Slovenia. *Forest Policy and Economics* 59. DOI: <https://doi.org/10.1016/j.forpol.2015.05.004>
- Ribeiro, D., Šmid Hribar, M. 2019: Assessment of land-use changes and their impacts on ecosystem services in two Slovenian rural landscapes. *Acta geographica Slovenica* 59-2. DOI: <https://doi.org/10.3986/AGS.6636>
- Rodela, R. 2012: Uvod v skupno lastnino in skupno upravljanje naravnih virov. Soupravljanje naravnih virov: vaše skupnosti in sorodne oblike skupne lastnine in skupnega upravljanja. Wageningen.
- Saito, O., Ichikawa, K. 2014: Socio-ecological systems in paddy-dominated landscapes in Asian Monsoon. *Social-Ecological Restoration in Paddy-Dominated Landscapes*. Tokyo. DOI: https://doi.org/10.1007/978-4-431-55330-4_2
- Shimada, D. 2014: External impacts on traditional commons and present-day changes: A case study of Iriai forests in Yamaguni district, Kyoto, Japan. *International Journal of the Commons* 8-1. DOI: <https://doi.org/10.18352/bmgm-lchr.348>
- Stritar, A. 2020: Planinski geografski informacijski sistem – PlanGIS. Modeliranje pokrajine. GIS v Sloveniji 15. Ljubljana. DOI: https://doi.org/10.3986/9789610504696_15
- Šmid Hribar, M., Bole, D., Urbanc, M. 2015: Public and common goods in the cultural landscape. *Geografski vestnik* 87-2. DOI: <https://doi.org/10.3986/GV87203>
- Šmid Hribar, M., Hori, K., Urbanc, M., Saito, O., Zorn, M. 2023: Evolution and new potentials of landscape commons: insights from Japan and Slovenia. *Ecosystem Services* 59. DOI: <https://doi.org/10.1016/j.ecoser.2022.101499>
- Šmid Hribar, M., Kozina, J., Bole, D., Urbanc, M. 2018: Public goods, common-pool resources, and the commons: The influence of historical legacy on modern perceptions in Slovenia as a transitional society. *Urbani izziv* 29-1. DOI: <https://doi.org/10.5379/urbani-izziv-2018-29-01-004>
- Šmid Hribar, M., Urbanc, M. 2016: Thee nexus between landscape elements and traditional practices for cultural landscape management. *Biocultural Diversity in Europe*. Cham. DOI: https://doi.org/10.1007/978-3-319-26315-1_28
- Šmid Hribar, M., Urbanc, M. 2022: Enclosed landscapes in Slovenia. *Enclosed Landscapes as Part of the European Agricultural Heritage*. London.
- Takeuchi, K., Ichikawa, K., Elmqvist, T. 2016: Satoyama landscape as social-ecological system: Historical changes and future perspective. *Current Opinion in Environmental Sustainability* 19. DOI: <https://doi.org/10.1016/j.cosust.2015.11.001>
- Tornaghi, C. 2012: Public space, urban agriculture and the grassroots creation of new commons: Lessons and challenges for policy makers. *Sustainable Food Planning: Evolving Theory and Practice*. Wageningen. DOI: https://doi.org/10.3920/978-90-8686-187-3_29
- UNESCO 2019: Operational guidelines for the implementation of the World Heritage Convention. Paris.
- Urbanc, M., Fridl, J., Resnik Planinc, T. 2021: Landscapes as represented in textbooks and in students' imagination: Stability, generational gap, image retention and recognisability. *Children's Geographies* 19-4. DOI: <https://doi.org/10.1080/14733285.2020.1817333>
- Urbanc, M., Ledinek Lozej, Š., Šmid Hribar, M. in press: Mountain pastures in the Slovenian Alps: Their role in shaping and sustaining the cultural landscape. *Discourses on Mountains of Montenegro and Slovenia*. Cham.
- Urbanc, M., Šmid Hribar, M., Kumer, P. 2020: Culture in Slovenia. *The Geography of Slovenia: Small But Diverse*. Cham. DOI: https://doi.org/10.1007/978-3-030-14066-3_13
- Woestenburg, M. 2018: Heathland farm as a new commons? *Landscape Research* 43-8. DOI: <https://doi.org/10.1080/01426397.2018.1503236>

COMMON LANDS AS A SYSTEM OF JOINT MANAGEMENT TO CONTRIBUTE TO COMMUNITY RESILIENCE? CASE FROM SLOVAKIA

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Common lands as a system of joint management to contribute to community resilience? Case from Slovakia

ABSTRACT: The traditional form of land management in Slovakia was represented by common lands and regulated by the legal form of *urbariates* or composite *sorates*, later reintroduced in the form of land associations. The aim of the article is to evaluate the transformation processes of the common lands and identify its contribution to community resilience against land conflicts by interviews realized among selected land associations. The results of the research point to the lack of motivation of owners of land associations to efficiently and sustainably use common land, which mostly becomes objects of rent with the view of quick profit. At the conclusion, we propose a set of measures that we recommend the state to apply in order to unify and streamline the activities of land associations in Slovakia.

KEY WORDS: common lands, collective actions, land associations, landscape resilience, Slovakia

Skupna zemljišča kot sistem skupnega upravljanja, ki prispeva k večji odpornosti skupnosti? Primer iz Slovaške

POVZETEK: Nekdanja oblika vzdrževanja zemljišč na Slovaškem so bila skupna zemljišča, ki so jih upravljala združenja lastnikov gozdov in pašnikov ter združenja lastnikov gozdov, pašnikov, podjetij in drugih posesti. Ti načini upravljanja so bili pozneje ponovno uvedeni v obliki zemljiških združenj. Avtorici v članku na podlagi intervjujev s predstavniki izbranih zemljiških združenj proučujeta procese preobrazbe skupnih zemljišč in njihovo vlogo pri krepitvi odpornosti skupnosti proti sporom glede zemljišč. Izsledki njune raziskave kažejo, da lastniki zemljiških združenj nimajo motivacije za učinkovito in trajnostno uporabo skupnih zemljišč, ki jih v želji po hitrem zaslužku večinoma oddajajo v najem. Avtorici na koncu predlagata niz ukrepov, ki bi jih morala uvesti država, da bi poenotila in izboljšala aktivnosti zemljiških združenj na Slovaškem.

KLJUČNE BESEDE: skupna zemljišča, skupni ukrepi, zemljiška združenja, odpornost pokrajin, Slovaška

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1 Introduction

According to the International Association for the Study of the Commons (<https://iasc-commons.org>) the general definition of common land is a system of land ownership, known also as the common field system, in which land is owned collectively by a number of persons, or by one person with others holding certain traditional rights, such as to allow their livestock to graze upon it, collect firewood, or cut turf for fuel. All common land is private property, whether the owner is an individual or a corporation (Neeson 1993). The system of joint management is widely known in several European countries, in particular in Ireland (Fabra-Crespo and Rojas-Briales 2015), Italy (Povellato and Vanni 2017), Slovenia (Šmid Hribar et al. 2018), etc., but modifications resulting from historical, political, and geographical conditions can be found in each country. In some (mostly post-socialistic) countries, the common method of land management as well as co-governance has disappeared based on the land reforms leading to socialism and during the transformation process after the socialistic political regime, while in several Alpine countries with more difficult geographical conditions, it has been preserved (Hogenová 2019).

As for the countries of the European continent, in countries such as the Czech Republic, Croatia, the Netherlands, Portugal, and the United Kingdom, common lands are not regulated by legislation (Hogenová 2019), on the contrary, in Sweden, Lithuania, Slovenia, Austria, Poland, and Romania only partially and in Latvia, common lands are regulated through the introduction of a legal institute of land associations (Parker and Cowan 1994; Fabra-Crespo and Rojas-Briales 2015). Some differences in the legislation of the land associations have been found in several countries, but the system of joint management works there to some extent. For example, land associations in Greece are represented only by cooperatives, while in Slovakia, these are special forms of agricultural enterprises. In Finland there are jointly owned forests, in Estonia there are no land associations as such, but the economic interests of individuals are represented through joint economic activity within established trade associations (Povellato and Vanni 2017). In Hungary, there is jointly owned agricultural and forest land, but no land associations in general, despite the common laws in force in Austria-Hungary (Hogenová 2019).

The advantages of common lands can be classified in several aspects in terms of functions and features that characterize them. The primary meaning and reason for establishing common lands was above all the protection of land and solving its fragmentation, contributing to the regional and rural development. As settled land problems can increase ties of owners to the land, ultimately it may lead to the more efficient cultivation of individual plots of land and the use of the given environment. Through common lands, there may be an increased ability of society in the given territory to more effectively use natural resources, such as transport food, energy, etc., which makes it more resistant to certain disasters as for example food, energy crisis, etc. (Magis 2010; Berkes and Ross 2013; Sharifi 2016).

The meaning of common lands should also partly consist in increasing or maintaining the so-called community resilience, according to Berkes and Ross (2013) mostly represented by people–place connections, values and beliefs, knowledge and learning, social networks, collaborative governance, economic diversification, infrastructure, leadership, and outlook. Many researchers (Aitchison 1990; Wilson and Wilson 1997; Short 2000; Short and Winter 2010) also point to the fact that non-functionality or improper coordination of common lands by public authorities may lead to several negative impacts. The functions of common lands in terms of the three relevant aspects and their possible impacts are presented in Table 1.

Land associations represent traditional legal forms of joint management and use of agricultural and forest land in Slovakia. *Urbariates* as a joint ownership of forests and pastures, composite *sorates* as a joint ownership not only forests and pastures, but enterprises or other properties, and similar legal institutes, for example cooperatives with joint ownership (currently called land associations) have a deep historical background, their origins dating back to the Middle Ages (Maslák and Jakubáč 2019).

Originally common land management as a form of co-ownership arose from the incitement of nobles in the 18th century due to rational management of agricultural and forest land. The legal form has been modified several times, which was related to the need to transform feudal relations, especially in the 19th century. The common denominator until the beginning of socialism in 1948 was the joint management of indivisible property of difficult to process and fragmented lands of several owners.

From a formal point of view, these forms were, as a rule, entered in the land register as a single plot of land with a list of individual owners and the size of their shares (Pauličková and Štefanovič 2004), and the dedication of the real plot of land could not be requested by the co-owner (Konôpka 2010).

The transformed form of co-ownership to the common lands persisted during the break-up of feudal relations in the 19th century and remained in content until 1958. By this time, according to Act No. 2/1958 Coll. on the Adjustment of ratios and management of Common lands (forests) of former *urbariates*, composite *sorates* and similar formations, about 2,504 land associations were abolished, of which approximately 400 were still fulfilling their functions at that time, while the others carried out practically no or minimal activity.

In the period of socialism, due to the legal regime, it was not possible to maintain the continuity of the joint management of its owners, as all legal forms of land associations were abolished *ex lege* and their immovable and movable property was aggregated for the purpose of industrial management by socialist cooperatives (Bandlerová et al. 2017).

After the fall of socialism in 1989, the state had to restructure the entire system of land ownership. The socioeconomic changes required new revision of legal land ownership and land use. Owners were given equal legal protection and equal restrictions based on constitutional and legal regulations. State authorities introduced the so called »Privatization of land« – as a result of which jointly owned land was confiscated into the ownership of the state or individuals (compulsory collective land use was cancelled) and the process of »individualization of farming« - transition to individual cultivation (as opposed to collective) (Lerman 2001).

The restitution process involved the return of land to original owners, including those belonging to land associations with joint ownership. As Wehrmann (2017) states, weak governance leads to weak tenure systems and contributes to poor land and resource management practices. At the same time, the legacy of the socialist system deprived landowners a set of particular values, personal identity, and emotional bonds (Van Dijk 2007), which, however, resulted in lack of will and readiness of the owners to acquire renewed land ownership. These threats were reflected to a lesser and greater extent in the conditions of Slovakia, including land associations, that lost interest and motivation in joint land management.

As the current land associations are the result of intensive transformation processes from the past, most researches in Slovakia (Pauličková and Štefanovič 2004; Konôpka 2010; Tóthová 2012; Bandlerová et al. 2017; Moľová 2017; Hogenová 2019; Maslák and Jakubáč 2019) are limited to the analysis of the forms and legal regulation of land associations, but until now there has been an absence of scientific studies that would investigate the importance of land associations in relation to current socio-economic needs, their impact in society or community and their importance in relation to the climate change.

For this reason, the aim of this paper is to evaluate the transformation of legal forms of land associations and to identify their functions in the aspect of their contribution to community resilience in Slovakia based on the principles and models of foreign studies (e.g., Wilson and Wilson 1997; Short 2000; Short

Table 1: Overview of functions of common lands and their possible impacts (Aitchison 1990; Wilson and Wilson 1997; Short 2000; Short and Winter 2010).

Functions of common lands	Positive	Negative
Economic	financial source of income	effort to maximize profit at the expense of sustainability
	lower costs redistributed between owners	demanding access to subsidies, grants
	possibility to receive subsidies, grants	
	joint land management and cultivation	
	a significant share of the economy of the country	
Social	simple transfer of ownership to another member	legislatively incomplete concept
	simple access to data	possible conflicts between co-owners
	preserving the traditional form of joint land management	a large share of co-owners of one property
	community resilience	lower interest in joint management of land
		insufficient public government in the area of common lands
Environmental	reduction of land fragmentation	using harmful pesticides to maximize profit
	protection of agricultural and forest land	
	unified ecological land management	

and Winter 2010; Wehrmann 2017). In our research, we focused on assessing the transformation of basic aspects of land associations in the context of their contribution to the community resilience:

1. Legal – in order to introduce the situation that led to the current status of land associations in Slovakia.
2. Economic – in order to evaluate the economic benefits of joint management of land associations.
3. Social – with a focus on decision-making in the land community and their relevance to the public.

2 Methods and research area

According to the Geodesy, Cartography and Cadastre Authority of the Slovak Republic (ÚGKK), there are 3,559 cadastral areas in 2,927 municipalities without the urban parts of Bratislava (17) and Košice (22). The Land Associations Register managed by the National Forestry Centre in Zvolen (<https://gis.nlcsk.org>) registers 2,922 active land associations, each municipality having as a rule only up to one land association. Since 99% of Slovakia's municipalities have a land association (Bandlerová et al. 2017), our research is based on the fact that land associations must have, or had in the past the particular importance to its members and to the general public.

Basic information on land associations was obtained through analysis of the Land Associations Register, which is government tool for data collection.

The primary source of the research consisted of structured interviews with 786 (out of a total of 2,922) randomly selected chairs and/or land community staff. In total, the interview consisted of 10 open-ended questions regarding basic information about the land association, the type of activity that association realizes, the size of the land association, its economic, social and environmental functions and future direction. We contacted every fourth association registered in the Land Associations Register, while the interviews were conducted by telephone in the form of a discussion in the period April–August 2022. In the first round, we received answers from 374 subjects, in the second from 318 subjects, and in the last round, we received answers from 94 representatives of land associations. In total, we received responses from 786 land associations from 98 municipalities in Slovakia, which represents a 27% from the total number of land associations registered in Slovakia.

In parallel, the employees of the Ministry of Agriculture and Rural Development in Slovakia and the Ministry of the Environment in Slovakia were interviewed in order to achieve information about the current status of land associations in Slovakia and their functions. The interviews consisted of similar questions as in the case of interviews realized with the representatives of the land associations, but we focused more on the functions, the importance, and effects that land associations represent for the society, the sustainability of Slovakia, and climate change itself.

Secondary sources of research were mainly the relevant legal acts regulating the land associations, where we carried out an analysis of the time series of developments and changes in the legal regulation of land associations in Slovakia between 1948 and 2022. Another source represented scientific publications of researchers in the field in Slovakia and abroad.

From a methodological point of view, the paper is drawn up through qualitative research, as we used methods such as an in-depth analytical approach in the field of theoretical questions and structured interviews formulated into scientific assumptions, which we subsequently supported by analysing empirical data.

3 Results and discussion

Slovakia can be characterized as a predominantly rural country, and agriculture remains important in terms of its productive and non-productive functions. According to the data provided by ÚGKK in 2021 of the total land area of Slovakia, 4,903,405 ha, 2,375,025 ha (48.43%) constitute agricultural land and 2,027,852 ha (41.36%) constitute forest land. The agricultural land is dominated by arable land of an area of 1,405,263 ha (59.17%) and agricultural land of an area of 850,027 ha (35.17%).

From ownership point of view, 77.54% of all land is owned by private subjects (both individuals and legal entities) and 22.46% of all agricultural land is under state control (5.69% is owned by state and 16.77% is under the management of State land fund as a land of unknown owners (Slovak Land Fund 2019)).

Land associations as a legal form were introduced into Slovak law by Act No. 181/1995 Coll. on Land associations, which restored all previous legal forms regulating the management of common land as well as those created under this Act. The legal concept of indivisibility of joint ownership of joint property was reintroduced and the impossibility of co-ownership of joint property was regulated and disposed of in accordance with the provisions of civil law (Section 4(1) of the Act). According to data from composite *sorate* of Vrútky – (slk. *Vrútocký komposesorát*), already at the time of submission of the draft law, approximately 1,700 land associations were renewed in Slovakia according to the restitution regulations, to which land was issued in an area of 427,748 ha of land (8.72% of total country area), of which agricultural land accounted for 132,601 ha (approximately 15% of total agricultural land area) and forest land 295,146 ha (approximately 14% of total forest land).

3.1 Legal transformation of land associations in Slovakia

Despite the success of the land-reform process in Slovakia, at the time there was no relevant prediction of the legal consequences of the restored ownership of land, which the state is still unable to deal with and are mainly:

1. Extreme land fragmentation – as key problem with harmful implications for land-use planning, land management, for private and public investments, sustainable economic growth and social development (Hudecová et al. 2018). Ministry of Agriculture and Rural Development in Slovakia (<https://www.mpsr.sk/>) identified in 2019: 8.4 million of ownership parcels; 4.4 million of owners; 100.7 million of co-ownership relations and 11.93 average numbers of owners in 1 parcel.
2. Land-use concentration – owners did not have the opportunities, i.e., lost interest in managing their own land, and therefore, almost 90% of all agricultural land is leased. This caused that although the users from the socialistic period have changed their legal form and often their ownership structure, they have retained a more or less unchanged tenancy structure and a decisive influence over the integrated use of land.

The land associations also suffered from the deficiencies mentioned above. The existence of a common land and its indivisibility initially protected its integrity; over time, its low flexibility became the reason for the need to amend the legislation. In 2007 and 2011 a draft new law on land associations was prepared, but it did not pass the legislative process due to its incompleteness (Tóthová 2012; Bandlerová et al. 2017). At that time, the legislators were unable to solve the issue of changing and streamlining the disposal of shared property. They sought to facilitate the division of the common land, which, however, encountered resistance from the land associations, which considered it to be contrary to the fundamental principles and attributes of this legal form.

Finally, Act No 97/2013 Coll. on Land associations as amended was adopted and is still in force. The law explicitly defines land associations as legal persons, namely:

- »forest and pasture community of owners of common property subject to special regulations defined by legislation until 1948 and established under special regulations;
- forest community, pasture community or land community established under special regulations entered in force during the transition period - Act No. 229/1991 Coll. on the adjustment of own relations to land and other agricultural property as amended;
- community of common land owners;
- community established directly by owners of jointly managed property; a jointly managed property is an agricultural land or forest land the owner of which, together with other owners of such land, establishes a community for the purpose of their joint management and use«.

The most fundamental interference with the current law is the elimination of the principle of indivisibility of common land, leaving the principle of the impossibility of cancellation and settlement of its co-ownership with the exception of the procedure defined in the case of land consolidation. The long-term trend in the ownership of common land shows that due to inheritance processes the number of co-owners is steadily increasing, while at the same time the number of co-owners willing to actively participate in activities of land associations and to stand as candidates for their elected bodies is decreasing. The second serious interference is the introduction of the possibility for the community to acquire ownership of shares in a common land (which was prohibited by the law in force), but only up to a limit of 49% of the share for one owner due to the limitation of concentration of ownership. Another note introduced by the new law was in the form of updating decision-making processes and clarifying the relations of the com-

munity with the Slovak Land Fund and with the Lesy Slovensko, s.e. (Ministry of Agriculture ... 2012). The legislation seeks to define the internal relations of individual members and society, but it does not reflect the current – broader social significance of land associations.

Quite exceptionally, there are mainly commentaries on the legislation of land associations (e.g., Maslák and Jakubáč 2019). Commentaries interpret individual provisions of the law without a broader scientific and research basis. There has not been research from qualitative or quantitative perspective in Slovakia so far, and therefore this paper also had the ambition to contribute to the whole society's debate and the emergence of scientific research revival legal form of land associations.

It can be considered a negative, that the law does not define in any way the key attribute of land associations, which is joint management and the common rights and obligations of its members. The law represents a formalistic approach to common lands and does not offer a progressive view of the legal form.

3.2 Economic aspects

Currently, 2,922 active land associations are registered by the Land Associations Register. About 60% of them were established in 1995 and the rest of active land associations was established by 2011. However, the exact establishment of the land associations cannot be explicitly determined in the paper because due to a new legal regulation, land associations had to be re-registered in 2019 and for this reason it is not possible to find out all the necessary data about their establishment from the official register. Nevertheless, according to National Forestry Centre in Zvolen since 2011, only a negligible number of new land associations (< 1%) have been created, mainly due to inefficiency of activities and weak regulatory flexibility of the existing ones.

In terms of ownership structure, there is a high degree of ownership fragmentation. The number of co-owners of a land associations ranges from 60 to 2,000, while the shares of the co-owners in some cases represent a fraction with a five-digit denominator (Ministry of Agriculture ... 2012). The co-owners of the land associations usually come from the village or its surroundings. Despite the high degree of ownership fragmentation, the legal institute of the indivisibility of joint property guarantees its land integrity, which facilitates its efficient management.

The research carried out showed that 96% of surveyed land associations managed both agricultural land and forest land. Only 4% were those that managed exclusively agricultural land. According to the data provided by ÚGKK in 2021 this proportion corresponds to approximately the national average. This is due to the fact that these agricultural plots are located in close proximity to the forest. The type of land also determines the management of the common land and the economic benefits accruing to its members. The management of the common land is defined by law mainly as the possibility of carrying out business activities. Within the meaning of Section 19(1) of the Land Associations Act, »the land association carries out, for the purposes of enterprising on common land or on jointly managed property, their joint use and procurement of common land resulting from ownership of them as follows:

- a) it carries out primary agricultural production and the related processing or transformation of agricultural products;
- b) it operates in forests and water areas.«

At the same time, the land community is also authorised to carry out other business activities under the Act No. 455/1991 Coll. on Trade entrepreneurship as amended.

Despite the diverse possibilities of doing business, all the land associations concerned exclusively rent agricultural land, namely to the agricultural entity which manages the land where the land association is located, on the basis of a lease agreement in accordance with the Act No. 504/2003 Coll. on the lease of agricultural land, agricultural enterprise and forest land and on the amendment of certain laws as amended. The rent for individual co-owners ranges from €30–€200 per ha and depends on the specific region of Slovakia. As a result, the land associations have no or minimal impact on land management and crop species production.

By contrast, as regards forest land, they are managed by land associations on their own account within the meaning of Act No. 326/2005 Coll. on Forests as amended. In forests on the basis of private-law contracts, they provide management under this Act, the forest management programme or extract thereof or the forest land management project through a forest manager. The economic benefit for the land community and its co-owners consists of generating a financial profit from the sale of timber felling or from the possibility of profit in kind in the form of harvesting of timber for their own purposes.

Land associations do not carry out any additional business activities or other activities generating additional income. As the research has shown, the regular business of land associations is mainly limited by:

- the lack of interest of co-owners and age composition as well as the large fragmentation of the shares;
- the absence of mechanisms for obtaining funds for joint management;
- the absence of employment mechanisms and legal regulation of land associations relations with state administration or municipal bodies. This is reflected in calamities (overgrowth of pests, other extraordinary incidents), in which there is no way to ensure quick action or reaction to the situation.

On the basis of the above, it can be concluded that land associations do not fulfill the traditional character of sustainable land management and mentioned economic functions (Table 1) as a purpose of joint management. In the case of land associations in Slovakia, it is exclusively a joint decision on who will manage the common land. The only motivation is to earn as much profit as possible. It has been shown that there is no incentive for co-owners to innovate business activities.

Since these are traditional legal forms of management, the existence of an approach to state support has also been examined. The employees of the Ministry of Agriculture and Rural Development of the Slovak Republic as well as the Ministry of the Environment confirmed that there is no specific support for these legal forms and that these are not considered by the Ministry of Agriculture and Rural Development in the future. Land associations may be eligible applicants for EU funds for areas of forestry, however, under the condition that the applicant must cultivate the land at the same time. Since agricultural land is mostly the subject of a lease, direct payments are generally not received by land associations. The most common reasons why land associations do not receive project support from EU funds include:

- forest management is ensured through outsourced services, and therefore there is no interest by land associations to invest financial resources in tangible assets;
- land associations do not generate enough profit to be able to co-finance projects and pay expenses related to project management;
- co-owners are not interested in investment activities of land associations.

This has a negative impact on motivating the sustainability of land associations for the future.

3.3 Social aspects

In the past, land associations performed several social functions for their members such as social responsibility, participative approach in the local development and their importance in society and the region (Bandlerová et al. 2017), which is evidenced mainly by the historical records of several land associations (*urbariates*, composite *sozates*).

However, it emerged from the questionnaire survey that social functions of land associations in Slovakia are currently gradually disappearing. Co-owners are mainly individuals who, on the basis of renewed ownership after the period of socialism, gained access to claim their ownership rights and obligations. These are either the original owners or the heirs, who, as a result of the revocation of property rights during the socialist period, lost their relationship to the land. On the other hand, it appears as a social potential that these co-owners come from the respective region or have ties to this region. Accompanying by suitable motivational, financial or other implemented tools, this may be used as a support of land associations and their potential for the community resilience.

However, the interviewed land associations confirmed the extremely low interest and willingness of co-owners to claim their ownership rights, with the exception of deciding on necessary procedural actions (redistribution of profit, approval of the lease agreement, etc.). As far as decision-making is concerned, in accordance with §9 paragraph 4 of the Act, is the ratio of co-owners' participation in the exercise of rights and obligations resulting from membership in the land associations, expressed by shares in the joint real estate. The co-owners meet at least once a year and make decisions by a majority of the votes of all members of the community, which with large numbers of co-owners can cause difficulty in decision-making processes (e.g., inability to find a compromise).

Based on this information, the low social responsibility and weak awareness of the importance of land associations for co-owners and for the residents of the region can be deduced. Unless state tools for the active support of the participation of its members are not set, the social functions and the associated purpose of the land associations will completely lose their meaning.

4 Conclusion

Land associations, as a legal form in Slovakia, represent the successors of traditional forms of land associations such as *urbariates* and composite *sorates*. Already at that time, these forms represented a way how to unite and manage a relatively high number of parcels with fragmented and individually inefficient ownership as easily as possible (Mořová 2017). The formalistic approach in flipping individual legal forms and institutes from before the period of socialism to the period after 1989 contributed to confusion and the lack of transparency of the legal form in the area of land associations, and in case of land ownership it deepened the conflict in access to land.

Today, the land associations operate in 99% of municipalities. The Act No. 93/2013 Coll. on Land associations as amended is the current legal regulation.

The common denominator of land associations is the management of common land and its indivisibility. The legal analysis revealed the necessity of defining joint management and defining the exercise of rights and obligations of members of land associations, because it is not possible to derive the degree of personal participation in the management of the community from the legal regulation. This shortcoming together with the low willingness and lack of awareness about the importance of the land associations imply weak participation in activities of the land associations. It is limited exclusively to procedural actions connected to the decisions about the management of the common land and about the organizational securing of the community.

On the other hand, the land associations as entrepreneurs have the potential to develop their economic and environmental activities. The advantage is that the joint property maintains its territorial unity even in the current conditions of extreme fragmentation of land ownership.

Because of that, it can be stated that the land associations show signs of an anachronistic legal form, which, however, has a high potential for ensuring activities of public interest for its members, or for the community resilience.

In this respect, state intervention in the following forms is necessary:

- creation of a functional Land Associations Register, including regular publishing of summary information about the land associations;
- introduction of economic instruments: subsidies (direct, project) to support infrastructure, and raising awareness about the importance of land associations for the region and community resilience;
- clarification of the legal regulation regarding the land associations, rights and obligations of its members.

A major problem in research in the field of land associations in Slovakia is the lack of any sources of information. As far as online Land Community Register is concerned, telephone and e-mail contacts listed on the website are not working, which makes any research in this field very difficult to realize. The only information that can be obtained is the list of land associations and their members, which must be searched individually.

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5 References

- Aitchison, J. W. 1990: The commons and wastes of England and Wales 1958-1989. Area 22-3.
- Bandlerová, A., Lazíková, J., Rumanovská, L., Lazíková, Z. 2017: Land associations in Slovakia. 7 Juridical Tribune 80.
- Berkes, F., Ross, H. 2013: Community resilience: toward an integrated approach. Society & Natural Resources 26-1. DOI: <https://doi.org/10.1080/08941920.2012.736605>
- Fabra-Crespo, M., Rojas-Briales, E. 2015: Comparative analysis on the communication strategies of the forest owners' associations in Europe. Forest policy and economics 50. DOI: <https://doi.org/10.1016/j.forpol.2014.06.004>

- Hogenová, M. 2019: Legislatívna úprava pozemkových spoločností (urbariáty, komposesoráty a iné právne úpravy) v krajinách Európskej Únie. Proceedings of study materials, Comenius University Bratislava. Bratislava.
- Hudecová, L., Geisse, R., Gašincová, S., Bajtala, M. 2017: Quantification of land fragmentation in Slovakia. *Geodetski list* 71-4.
- Konôpka, J. 2010: Príručka vlastníka a obhospodarovateľa lesa. Zvolen.
- Lerman, Z. 2001: Agriculture in transition economies: from common heritage to divergence. *Agricultural Economics* 26-2. DOI: <https://doi.org/10.1111/j.1574-0862.2001.tb00057.x>
- Magis, K. 2010: Community resilience: An indicator of social sustainability. *Society and natural resources* 23-5. DOI: <https://doi.org/10.1080/08941920903305674>
- Maslák M., Jakubáč R. 2019: Zákon o pozemkových spoločnostiach - komentár. Bratislava. Ministry of Agriculture and Rural Development in Slovakia. 2012: Dôvodová správa k zákonu o pozemkových spoločnostiach č. 97/2013 Z. z. Bratislava.
- Molová, K. 2017: Pozemkové spoločnosti – História a súčasné modely pozemkových spoločností. Ulpianus. Internet: <https://www.ulpianus.sk/blog/pozemkove-spolocenstva-1.-historia-a-modely-pozemkovych-spolocenstiev> (30. 8. 2022).
- Neeson, J. M. 1993: *Commoners: common right, enclosure and social change in England*. Cambridge.
- Parker, F. E., Cowan, H. I. 1944: Post-War Reconstruction. *Bulletin of the United States Bureau of Labor Statistics* 770.
- Pauličková, A., Štefanovič, M. 2004: Pozemkové právo. *Časopis pro právní vědu a praxi* 12-1.
- Povellato, A., Vanni, F. 2017: Nuovi strumenti per le politiche fondiarie. *Banca della terra e associazioni fondiarie. Agriregionieuropa* 13-49.
- Sharifi, A. 2016: A critical review of selected tools for assessing community resilience. *Ecological Indicators* 69. DOI: <https://doi.org/10.1016/j.ecolind.2016.05.023>
- Short, C. 2000: Common land and ELMS: a need for policy innovation in England and Wales. *Land Use Policy* 17-2. DOI: [https://doi.org/10.1016/S0264-8377\(00\)00007-7](https://doi.org/10.1016/S0264-8377(00)00007-7)
- Short, C., Winter, M. 2010: The problem of common land: Towards stakeholder governance. *Journal of Environmental Planning and Management* 42-5. DOI: <https://doi.org/10.1080/09640569910911>
- Slovak Land Fund. 2019: Annual Report 2019. Bratislava.
- Šmid Hribar, M., Kozina, J., Bole, D., Urbanc, M. 2018: Public goods, common-pool resources, and the commons: The influence of historical legacy on modern perceptions in Slovenia as a transitional society. *Urbani izziv* 29-1. DOI: <https://doi.org/10.5379/urbani-izziv-2018-29-01-004>
- Tóthová, L. 2012: Pozemkové spoločnosti – aktuálne otázky. *Mílniky práva v stredoeurópskom priestore*. Bratislava.
- Van Dijk, T. 2007: Complications for traditional land consolidation in Central Europe. *Geoforum* 38-3. DOI: <https://doi.org/10.1016/j.geoforum.2006.11.010>
- Wehrmann, B. 2017: Understanding, preventing, and solving land conflicts. A practical guide and toolbox. Eschborn.
- Wilson, O. J., Wilson, G. A. 1997: Common cause or common concern? The role of common lands in the post-productivist countryside. I: <https://doi.org/10.1111/j.1475-4762.1997.tb00006.x>

Guidelines for contributing authors in Acta geographica Slovenica

EDITORIAL POLICIES

1 Focus and scope

The *Acta geographica Slovenica* journal is issued by the ZRC SAZU Anton Melik Geographical Institute, published by the ZRC SAZU Založba ZRC, and co-published by the Slovenian Academy of Sciences and Arts.

Acta geographica Slovenica publishes original research articles from all fields of geography and related disciplines, and provides a forum for discussing new aspects of theory, methods, issues, and research findings, especially in Central, Eastern and Southeastern Europe.

The journal accepts original research articles and review articles. Articles presenting new developments and innovative methods in geography are welcome. Submissions should address current research gaps and explore state-of-the-art issues. Research-based on case studies should have the added value of transnational comparison and should be integrated into established or new theoretical and conceptual frameworks.

The target readership is researchers, policymakers, students, and others who are studying or applying geography at various levels.

The journal is indexed in the following bibliographic databases: Clarivate Web of Science (SCIE – Science Citation Index Expanded; JCR – Journal Citation Report/Science Edition), Scopus, ERIH PLUS, GEOBASE Journals, Current Geographical Publications, EBSCOhost, Georef, FRANCIS, SJR (SCImago Journal & Country Rank), OCLC WorldCat, Google Scholar, and CrossRef.

2 Types of articles

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

3 Special issues

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

4 Peer-review process

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

5 Publication frequency

Acta geographica Slovenica is published three times a year.

6 Open-access policy

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

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

The journal's publication ethics and publication malpractice statement is available online, as well as information on subscriptions and prices for print copies.

AUTHOR GUIDELINES

Before submitting an article, please read the details on the journal's focus and scope, publication frequency, privacy statement, history, peer-review process, open-access policy, duties of participants, and publication ethics. See also the latest version of the author guidelines online. All the materials are available at <https://ags.zrc-sazu.si>

1 Types of articles

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

2 Special issues

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

3 The articles

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

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

Research articles should have the following structure:

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

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

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

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

4 Article submission

4.1 Open journal system

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

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

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

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

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

4.2 Language

Articles are published in English.

Articles can be submitted in English or Slovenian.

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

All articles should have English and Slovenian abstracts.

4.3 Graphic file submission

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

4.4 Submission date

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

5 Citations

Examples for citing publications are given below. Citing »grey literature« is strongly discouraged. In case there are more than seven authors, list the first seven followed by et al.

5.1 Citing articles

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

5.2 Citing books

- Cohen, J. 1988: *Statistical power analysis for the behavioral sciences*. New York.
- Fridl, J., Kladnik, D., Perko, D., Orožen Adamič, M. (eds.) 1998: *Geografski atlas Slovenije*. Ljubljana.
- Hall, T., Barrett, H. 2018: *Urban geography*. London. DOI: <https://doi.org/10.4324/9781315652597>
- Hall, C. M., Page, S. J. 2014: *The geography of tourism and recreation: Environment, place and space*. New York. DOI: <https://doi.org/10.4324/9780203796092>
- Luc, M., Somorowska, U., Szymańda, J. B. (eds.) 2015: *Landscape analysis and planning*. Springer Geography. Heidelberg. DOI: <https://doi.org/10.1007/978-3-319-13527-4>
- Nared, J., Razpotnik Visković, N. (eds.) 2014: *Managing cultural heritage sites in southeastern Europe*. Ljubljana. DOI: <https://doi.org/10.3986/9789610503675>

5.3 Citing chapters of books or proceedings

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

5.4 Citing expert reports, theses, dissertations and institutional reports

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

- Holmes, R. L., Adams, R. K., Fritts, H. C. 1986: Tree-ring chronologies of North America: California, Eastern Oregon and Northern Great Basin with procedures used in the chronology development work including user manual for computer program COFECHA and ARSTAN. Chronology Series 6. University of Arizona, Laboratory of tree-ring research. Tucson.
- Hrvatin, M. 2016: Morfometrične značilnosti površja na različnih kamninah v Sloveniji. Ph.D. thesis, Univerza na Primorskem. Koper.
- Šifrer, M. 1997: Površje v Sloveniji. Elaborat, Geografski inštitut Antona Melika ZRC SAZU. Ljubljana.
- World commission on environment and development 1987: Our common future: Brundtland report. Oxford.

5.5 Citing online materials with authors

- Tiran, J. 2021: Slovenija se je v celoti odela v modro. Metina lista. Internet: <https://metinalista.si/slovenija-se-je-v-celoti-odela-v-modro/> (3. 11. 2021).
- Davies, G. 2017: The place of data papers: Producing data for geography and the geography of data production. Geo: Geography and Environment. Internet: <https://blog.geographyandenvironment.com/2017/09/27/the-place-of-data-papers-producing-data-for-geography-and-the-geography-of-data-production/> (8. 11. 2021).

5.6 Citing websites without authors (e.g. websites of projects and institutions)

Use in-text citations only. It is not necessary to include a citation in the reference list. The in-text citation should include the URL.

5.7 Citing publicly archived data (e.g. statistical data)

Use in-text citations only. It is not necessary to include publicly archived datasets in the reference list. The in-text citation should include the name of the dataset, the institution providing the data and the time frame of the data used.

When the data you cited were published as a report, add it to the reference list and use the following format:

- Popis prebivalstva, gospodinjstev, stanovanj in kmečkih gospodarstev v Republiki Sloveniji, 1991 – končni podatki. Zavod Republike Slovenije za statistiko. Ljubljana, 1993.
- Agriculture, forestry and fishery statistics. 2020 edition. Publications Office of the European Union. Luxembourg, 2020.

5.8 Citing geospatial data and cartographic materials

Geospatial data used in maps should be cited in the colophon on the map (see the Table and Figures section of the Authors' Guidelines). It is not necessary to include geospatial data in the reference list.

When cartographic materials are published as an independent monograph, add it to the reference list and use the following format:

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

5.9 Citing legal sources

Use in-text citation. It is not necessary to include a citation in the reference list. The in-text citation should include the title of legal document and the year.

5.10 In-text citation examples

All references in the reference list are cited in the text. In-text citations should include the last name of the author(s) or the name of the institution, and the year of publication. Separate individual citations by semicolons, arrange citations by year of publication, and separate the page information from author(s)' names and years by a comma; for example: (Melik 1955), (Melik, Ilešič and Vrišer 1963; Gams 1982a; Gams 1982b; World Commission on Environment and Development 1987). For references with more than three authors, cite only the first, followed by et al.: (Melik et al. 1956). Give page numbers only for direct quotations. Narrative citations: Perko (2016, 25) states: »Hotspots are ...« or parenthetical citation (Kokole 1974, 7–8).

When citing online materials without authors, such as project or institutional websites, the URL should be included, for example: »The aim of the LABELSCAPE project is to develop mechanisms for integrating sustainability labels into tourism policy (<https://labelscape.interreg-med.eu>).«

When citing publicly archived data, such as statistical data, inform the reader in the text with the name of dataset, the time frame, and the institution that provides the data: »The 2000–2020 population data used in the analysis were provided by the Eurostat«. If the statistical data were published as a report, cite the document, e.g. (Popis prebivalstva ... 1993).

When citing legal sources such as legislative acts, white papers, etc., you should provide (short formal) title and the year, for example: »... The European Commission's White paper on transport (2011) sets out ten strategic goals for a competitive and resource-efficient transport system: ...«

5.11 Reference list

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

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

6 Tables and figures

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

Table 1: Number of inhabitants of Ljubljana.

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

Tables and figures must be indicated in the main text in parentheses, for example »(Table 1)«, or as a part of the sentence, for example »... as can be seen in the Table 1«.

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

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

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

Figure 1: Location of measurement points along the glacier.

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

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

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

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

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

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

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

Scale: 1:1,000,000

Content by: Drago Perko

Map by: Jerneja Fridl

Source: Statistical Office of the Republic of Slovenia 2002

© 2005, ZRC SAZU Anton Melik Geographical Institute

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

Photos must be in raster format with a resolution of 600 dpi, preferably in .tif or .jpg formats.

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

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

SUBMISSION PREPARATION CHECKLIST

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

- I, the corresponding author, declare that this manuscript is original, and is therefore based on original research, done exclusively by the authors. All information and data used in the manuscript were prepared by the authors or the authors have properly acknowledged other sources of ideas, materials, methods, and results.
- Authors confirm that they are the authors of the submitting article, which is under consideration to be published (print and online) in the journal *Acta geographica Slovenica* by Založba ZRC, ZRC SAZU.
- All authors have seen and approved the article being submitted.
- The submission has not been previously published, nor it is under consideration in another journal (or an explanation has been provided in Comments to the Editor). Authors have disclosed any prior posting, publication or distribution of all or part of the manuscript to the Editor.
- Upon publishing an article in a journal the authors agree to license non-exclusive copyrights to ZRC SAZU (Založba ZRC): they retain the copyright in the scope that enables them to continue to use their work, even by publishing it in one of the personal or institutional repositories before the publication of the article in the journal.
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- Permission has been obtained for the use (in printed and electronic format) of copyrighted material from other sources, including online sources. Restrictions on the transfer of copyright on this material have been clearly indicated.
- All the necessary permits to work with people have been obtained in the research related to the article (in accordance with the applicable laws and institutional guidelines and approved by the relevant institutions).
- The journal policies and guidelines have been reviewed and followed.

- The metadata (title, abstract, key words, authors, affiliation, ORCID, etc.) are provided in English (Slovenian authors must provide the metadata also in Slovenian language).
- The list of authors is complete. Failure to do so may result in co-authors not being listed on the article at publication.
- The submission is in Microsoft Word format and the document template was used (single-spaced text, 12-point font, no formatting except italics and bold).
- The article has been checked for spelling and grammar.
- Figures are not embedded in the Word file and are provided as a graphic file: editable vector format (e.g., cdr, ai) for maps and illustrations; tif for photographs; xlsx for graphs. The Word file includes only figure captions.
- Tables are placed in the Word file with text at the appropriate place.
- The reference list was prepared following the guidelines.
- All references in the reference list are cited in the text.
- Where available, URLs and DOI numbers for references are provided.
- Graphic files are in one .zip file.
- Authors agree that any costs of English proofreading are borne by the author(s). No additional costs are associated with the submission.
- The instructions for ensuring a double-blind review have been followed.

ACTA GEOGRAPHICA SLOVENICA EDITORIAL REVIEW FORM

This is a review form for editorial review (version 14) of an article submitted to the AGS journal.

This is an original scientific article.

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

- Yes
- No

The article follows the standard IMRAD/ILRAD scheme.

- Yes
- No

The article's content is suitable for reviewing in the AGS journal.

(The article is from the field of geography or related fields of interest, the presented topic is interesting for the readers of *Acta geographica Slovenica* and well presented. In case of negative answer add comments below.)

- Yes
- No

Editorial notes regarding the article's content.

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

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

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

Is the language of the article appropriate and understandable?

RECOMMENDATION OF THE EDITOR

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

ACTA GEOGRAPHICA SLOVENICA REVIEW FORM

This is *Acta geographica Slovenica* review form (version 7).

1 RELEVANCE

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

- yes
- no
- partly

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

- yes
- no

2 SIGNIFICANCE

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

- yes
- no
- partly

Does it bring relevant results for contemporary geography?

- yes
- no
- partly

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

- high
- middle
- low

3 ORIGINALITY

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

- yes
- no

Does the article discuss a new issue?

- yes
- no

Are the methods presented sound and adequate?

- yes
- no
- partly

Do the presented data support the conclusions?

- yes
- no
- partly

4 CLARITY

Is the article clear, logical and understandable?

- yes
- no

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

5 QUALITY

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

- yes
- no

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

- yes
- no

Propose amendments, if no is selected:

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

- yes
- no

Propose amendments, if no is selected:

Is the quoting in the text appropriate?

- yes
- no
- partly

Propose amendments, if no is selected:

Which tables are not necessary?

Which figures are not necessary?

COMMENTS OF THE REVIEWER

Comments of the reviewer on the contents of the article:

Comments of the reviewer on the methods used in the article:

RECOMMENDATION OF THE REVIEWER TO THE EDITOR-IN-CHIEF

Please rate the article from 1 [low] to 100 [high] (this will NOT be presented to the author):

Personal notes of the reviewer to the editor-in-chief (this will NOT be presented to the authors):

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Authors shall provide a professional translation of articles not originally in English. The name of the translator must be reported to the editor.

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

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

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

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

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

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

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

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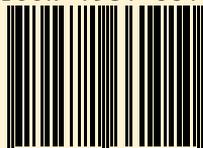
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