

Young Academics Award 2024

Main prize winners

1st PRIZE: Agnese Moroni

Thesis title: Snowmaking as Maladaptation: Towards a Socially Inclusive and Sustainable Water Management Approach in the Alps

The study is driven by a combination of external factors and academic motivations, rooted in the growing concern surrounding climate change impacts on the Alpine region. The NeveDiversa 2023 report provided a foundational basis for the study, offering insights into the evolving challenges faced by winter tourism due to climate change. In general, there has been a significant increase recently in scientific publications focusing on climate change in the Alps, indicating a growing recognition of the urgency and complexity of the issue within the academic community.

Despite this growing availability of reports and data on climate change impacts in the Alps, however, there is still a lack of in-depth understanding of the perceptions and experiences of local inhabitants. This gap in knowledge prompted the study to delve deeper into the perspectives of individuals living and working in Alpine communities, aiming to complement existing scientific literature with firsthand insights and narratives.

The study's motivations were further fueled by recent environmental events, including a firsthand experience of drought in Val Susa during summer 2022 and the following winter season. This personal encounter with the effects of climate change made even clearer the immediacy and severity of the challenges faced by Alpine regions. Additionally, this individual perception was confirmed by increasing media attention on the drought situation in the news that highlighted the relevance and urgency of the study's objectives.

Considering these contextual factors, the study aims to contribute to the existing body of knowledge by providing a nuanced understanding of the impacts of climate change on Alpine communities from the perspective of local inhabitants. By bridging the gap between scientific research and lived experiences, the study seeks to generate actionable insights that can inform adaptation and mitigation strategies, ultimately contributing to the resilience and sustainability of Alpine regions in the face of environmental change.

2nd PRIZE: Elena Grace Siegrist

Thesis title: Landscapes in a changing climate - Evaluation and illustration of the impacts of climate change on landscapes in Switzerland using the case study landscape Ramosch (GR)

Anthropogenic climate change poses one of humanity's most urgent and critical challenges (IPCC, 2022). The impacts of climate change on Switzerland, and especially the Swiss Alps, are evident today, e.g., glacial retreat, rising temperatures, more frequent heatwaves and changing precipitation patterns (NCCS 2018a). Climate scenarios for Switzerland predict

major changes in temperature and precipitation regimes, affecting people, natural ecosystems, agriculture and forestry, natural hazards and ultimately, the landscape (Köllner et al. 2017; NCCS 2018a). Due to its topographical and climatic conditions, Switzerland will most likely experience greater than average temperature changes (NCCS 2018a). Significant changes to local landscapes can disrupt the provision of landscape services and cause social and economic damage. Yet, a comprehensive understanding of the impacts of climate change at the integrating landscape scale is currently lacking.

This must be seen as a considerable research gap: Landscapes significantly contribute to quality of life (Council of Europe 2000; Keller & Backhaus 2017; Rey et al. 2017). Accordingly, landscapes are crucial for the well-being of both individuals and communities as a whole (Council of Europe, 2000). Landscapes are an essential part of people's environment and create habitats for flora and fauna (Council of Europe 2000; Grêt-Regamey et al. 2012; Hermes et al. 2018; Manzo & Devine-Wright (eds.) 2013; Rey et al. 2017; Ridding et al. 2018; Wartmann et al. 2021). Moreover, they are a valuable resource and provide many ecosystem and landscape services to humans. They enable affective relationships between people and specific places, which in turn contributes to the building of social identities and local cultures (Council of Europe 2000; Hermes et al. 2018; Manzo & Devine-Wright (eds.) 2013; Rey et al. 2017; Ridding et al. 2018; Wartmann et al. 2021). Other services include aesthetic enjoyment, recreational opportunities and site attractiveness, to name just a few (Keller et al. 2019). Many of the sectoral impacts of climate change in agriculture, tourism or settlement development impact landscapes not only in combination but also in interaction (FOEN & MeteoSwiss 2020). Consequently, an integral understanding of the impact of climate change on landscapes, which addresses sectoral interactions, is quintessential for gaining a deeper understanding of the ecological and socio-cultural impacts of climate change and subsequently developing context-specific strategies and measures for climate-resilient development.

Furthermore, adopting a landscape perspective can facilitate sensitising for local impacts of climate change and engaging the general public in finding solutions for climate-resilient development. Firstly, because landscapes are considered to be a so-called boundary object (Opdam et al., 2015) and secondly, because landscapes are often intricately intertwined with personal identity (Hunziker et al., 2007; Manzo & Devine-Wright, 2013).

3rd PRIZE: Christina Dollinger

Thesis title: Evaluating the long-term success of currently and historically applied forest management strategies in the management zone of the Berchtesgaden National Park under climate change

Given the deteriorating state of the biosphere, ecosystem restoration is of prime importance. Restoration management is the assisted recovery of degraded ecosystems and habitats in order to restore biodiversity, ecosystem functioning, and the supply of ecosystem services (McDonald et al., 2016). The future of forests is particularly relevant as they are currently major carbon sinks (Harris et al., 2021) and harbor the majority of terrestrial biodiversity (FAO & UNEP, 2020). Restoration efforts in forest ecosystems, for example, can help to restore carbon stocks (Domke et al., 2020) and mitigate climate change (Lewis et al., 2019), as well as reintroduce species that have been lost from the landscape. Forest restoration is particularly relevant in

areas such as Central Europe, where forests were the dominating primary vegetation, but were heavily modified by centuries of human use (Roberts et al., 2018).

But, restoration management is faced with considerable challenges. The long-term effects of restoration are often hard to evaluate, particularly in ecosystems that develop over time scales from decades to centuries, such as forests. Simulation modelling is a powerful tool to quantitatively assess potential future forest trajectories (Thrippleton et al., 2020). Process-based models that assess the impacts of climate change have matured considerably over the past decades and are increasingly applied also in the context of restoration management (Shackelford et al., 2021). One advantage of simulation modelling is that it allows the evaluation of long-term trajectories of ecosystem development with and without restoration measures.

Protected areas are often main facilitators of restoration projects, given that intact ecosystems are a central aim of their management. In Germany, this is reflected by the fact that certain protected areas have a legal obligation for restoration management. Berchtesgaden National Park (BGNP), for instance, Germany's only national park in the Alps, is tasked by law makers to preserve and restore site-native forest ecosystems (StMUV, 1978), as intensive timber production and use in previous centuries has resulted in large forest areas characterized by biotic homogenization and reduced structural complexity. The national park administration has worked to restore these ecosystems since 1987, providing an example for one of the longest running and still ongoing forest restoration projects in the Alps. Restoration activities have included the creation of gaps and replanting with Silver Fir and European Beech – species currently underrepresented in the mixed mountain forests typical for the National Park. Yet, how the increasing pace of change can be addressed in such restoration considerations – both inside and outside of protected areas – remains largely unclear.

Infopoint prize winners

Chamonix Infopoint: Fiona Hurrey

Thesis title: Dichotomies of Human-Wildlife Conflict: Drivers of Policy Choice and Barriers to Coexistence in the Context of Wolves in France

This research is situated in a national, European, and global context of ambition to protect and restore biodiversity. It assumes that meeting related objectives may imply human compromise and, particularly in the case of large predators, increased risk of negative impacts. When governments do not clearly and consciously define policy objectives and acknowledge compromises inherent to policy choices, they may create barriers to policy success and to public satisfaction with results contrary to biodiversity objectives.

My thesis examined the French case of wolf-related human-wildlife conflict (HWC) to unpack drivers of wildlife-related policymaking in situations of conflict and to understand barriers to effective conflict mitigation. It is situated in a context of high-profile political and societal tensions around the topic disproportionate to the level of impacts of wolves on the agriculture sectors and low level of risk for humans. It is thus a particularly suitable case through which

to explore the role of emotions in policymaking through a novel analysis framework, particularly in situations of human-wildlife conflict

This thesis builds upon an impressive body of multi-disciplinary literature on the case study and related cases, including in the fields of philosophy and ontology, cultural and historical studies, diplomatic studies, natural and technical sciences, political science, ecological justice, ethnology, and sociology.

Existing literature has predominantly focused on the impacts of wolves on human activities and agricultural vulnerabilities, with early French academic work focused on addressing misinformation on whether wolves had been re-introduced or had “naturally” returned to France. It includes work from the biological sciences on wolves in France and on the ethnological and social impacts of wolf presence on farmers. Past work has also explored different practices and technologies for cohabitation with wolves, from philosophically considering the sharing of space by humans and wolves, to technical evaluation of measures for agricultural defence. Notably absent is research into the politics of policymaking.

By blending novel methodologies to take a ‘politics of policymaking’ exploratory approach, this thesis provides a unique analysis of HWC, large predator conservation, and biodiversity-related policymaking. The Q method is growing in popularity for cases of HWC around the world but has not appeared in relevant French cases. It allows exploration of the subjectivities of institutional stakeholders involved in the policymaking process. Existing research in France related to wolves has largely focused on stakeholders such as farmers and rural communities and their experiences with the presence of wolves. Emotional public policymaking was researched by Pepin-Neff in the case of shark attacks with a new ‘high-emotion low policy’ framework. The HELP framework builds upon a large body of literature on the effects of emotion in policy, assuming that emotions and attention are treated by political actors and governments as public resources to be managed and distributed. It sees emotions as being revealing of hierarchies which prejudice certain issues at certain times.

Domodossola Infopoint: Jonathan Ambroggi

Thesis title: **Innovation at Altitude: Drivers and Impact of Social Innovation across the Italian Alps**

Traditional technological innovation is considered key for economic growth and development (Mazzucato, 2015). However, because of their specific economic, social, political, geographical, and ecological characteristics, mountains are considered to have a low capacity for market and technological innovations (Kovacs et al., 2016). This has resulted in some mountain areas experiencing depopulation, economic decline, and marginalisation. In this context, SIs should be explored as alternative ways to tackle traditional challenges in these communities (Vercher, 2022; Kovacs et al., 2016; Lukesch et al., 2020). The thesis investigates the drivers of the adoption of social innovation (SI) in mountain areas in Italy and their societal impact.

In both the academic and policy domains there has been a growing interest in SI (Galego et al., 2022; Agostini et al., 2017; BEPA; 2010). Innovation has been traditionally understood as technological improvements in products and services, whose primary aim is generating value

in economic terms (Howaldt and Schwarz, 2010; Pol and Ville, 2009). In contrast, in SI the role of the community, the societal value added by the innovation, and the effects of innovation on well-being are key elements of consideration. After the financial crisis of 2008, an increasing number of academics, policymakers, and practitioners have been turning their attention to SI as a means to “implement creative ways of meeting social needs and to build cohesive and sustainable societies” (Grimm et al., 2013, p.437).

While social innovation has been studied in academic literature, insights from studies of urban SI (which are the majority in the literature) cannot always be extrapolated to rural contexts because of the heterogeneity and territorial specificities of the studied cases (Vercher, 2022). Even fewer studies of SI have been carried out in mountain communities. Yet, unmet social needs abound in mountain areas, ranging from ageing and a lack of essential services to depopulation and little opportunities for socioeconomic development (Ravazzoli et al., 2019; Perlik and Membretti, 2018; Mantino, 2010). The climate crisis has also exposed the fragility of these communities in ecological terms (EEA, 2010). In marginalised mountain areas, it has been argued that SI has the potential to address local problems more effectively, foster community empowerment, and incentivise a more sustainable use of local resources for regional development (Zanon, 2018; Perlik and Membretti, 2018; Stettler and Mayer, 2023; Gretter et al., 2019).

Grand Paradis Infopoint: Benjamin Buchan

Thesis title: Living With the Glaciers: The Use of Visual Anthropology in Exploring the Lived Experience of Retreating Glaciers [Case Study: Rifugio Quintino Sella al Felik mt.3555, Ayas, Valle D’Aosta, Western Alps]

For centuries, the Alps have been at the centre of scientific research, exploration and subject of romanticisation for its visitors. In recent decades, with the acceleration of glacial retreat, the glaciers of the Alps have become protagonists of awareness campaigns on climate change. Glaciers have noticeably become icons of climate change (Inkpen, 2018) and “endangered species” (Carey, 2007). Images of retreating glaciers are used daily in multiple contexts as characters to spread awareness of the issues of climate change. Consequently, there has been an exponential rise of glacier related images in mainstream media across the world, reaching people and places which are geographically and culturally very distant from glaciers, creating first encounters with glaciers for many people.

However, as discussed by Inkpen (2018) and Carey (2007), these images come with a series of issues. These images fail to include or consider the impacts and relationships between glaciers and people. This contributes to portraying glacial retreat as a distant and masterless issue. Climate change and glacial retreat become absorbed in grand narratives which are quickly dismissed by the public.

The aim of this research is to go beyond the contemporary sterile depiction of alpine glacial environments, and to investigate the deep cultural implications of glacial retreat on mountain communities, to thus create encounters that represent the entirety of glacial systems, including both people and the environment as agents of the system. This study will provide a

better understanding of the cultural significance of glacier loss on local identities and it will do so through two previously written pieces of literature.

Firstly, the project engages with theories of the disciplines of environmental anthropology and human geography in reference to human-environment relationships, specifically to glacier-human relationships (Gagne, 2018; Cruikshank, 2005). The thesis explores interconnectivity between humans and non-humans (Haraway, 2016; Latour, 2004), as well as the environmental historian Cronon's (1995) ideas on wilderness to examine human impact on ecosystems and how anthropogenic climate change affects human experiences. Thus, I critique the dominance of Euro-Western perspectives in climate change discussions and policy making, highlighting the neglect of local experiences in climate-sensitive communities. I then expand on the theoretical framework offered by the recently published book "Ice Humanities" (Dodds & Sörlin, 2022). This integrates various studies on the cryosphere carried out in the disciplines of social sciences and humanities. Here, I bring in the ethnographic research offered by Cruikshank and Gagné respectively in Canada and Ladakh. These studies offer a new narrative on the relationship between glaciers and humans which I take into consideration for the analysis of the alpine-cultural ecosystem.

The second body of literature is concerned with the visual representations of glaciers in media. Expanding on Inkpen's and Carey's arguments of contemporary iconography of glaciers, the research aims to highlight the issues with current glacial representations. I offer a different perspective on glacial environments of the Alps highlighting how intertwined their existence is with local populations. The research critically engages with alternative visual methodologies to repeat photography. Key to the methodology of the project is a short ethnographic documentary, "Rouja, Beyond the Melting", which follows the life in a mountain hut on the Monte Rosa. The film highlights alternative methods of engaging with glacial landscapes through visual means which recenter the human-glacier relationship.

Mojstrana Infopoint: Ambrož Černe

Thesis title: **Location-based game as a mode of revitalization of hay-racks in Upper Sava Valley**

Hay-racks have been used by Slovenian (mostly Alpine) farmers for centuries to dry various crops and fodder for their livestock. However, in recent decades, various experts have expressed concern regarding the diminishing role of their original function and their gradual disappearance from the landscape. In recent decades, they have been replaced by other agricultural practices and increasingly modern agricultural mechanisation. Architects, ethnologists, art historians, conservators, linguists and many others consider hay-racks as a unique phenomenon of the cultural landscape of Slovenia as well as other areas of the Alpine region such as Italy and Austria. Despite the fact that the first scientific discussion of hay-racks was produced by the Slovenian geographer Melik in 1931, sources indicate that geography could have been more involved in this field.

The research focuses on the hay-racks in the far northwestern part of Slovenia as a heritage that has almost completely lost its original function; their overly "simple" architecture makes it difficult to assign them any other function. The Institute for the Protection of the Cultural Heritage of Slovenia (ZVKDS) is already acting as an institutional guardian for the selected

hay-racks. This thesis, however, focuses on other stakeholders and their attitude towards the hay-racks. The central question was how to approach this heritage in a way that would enable us to discuss not only its protection or preservation, but also its interpretation. The research places emphasis on the educational aspect of hay-racks, with elementary school children as the target group for interpretation. The typology was used to identify which hay-racks or their areas could serve an educational purpose. Finally, a gamified form of education was developed for these designated areas.

The review of reference sources and literature was divided into three sections. The first section included information on hay-racks, including their elements, typology across Slovenian landscapes, their function and contemporary challenges, which required a distinctly multidisciplinary approach. The authors are mostly architects (Mušič, 1970; Juvanec, 2007; Zupančič, 2015; Juvanec, 2020), ethnologists (Cevc et al., 1993; Hazler, 2002, 2004; Roškar, 2020), conservators (Štepec, 2011; Roškar, 2020), art historians (Stele, 2008) and linguistics (Smole, 1996; Klinar, 2020). The second section focused on the most recent scientific contributions dealing with heritage in the function of interpretation, education and gamification. A diverse literature on this topic is publicly available, ranging from Slovenian (e.g., Fakin Bajec et al., 2021; Draženović et al., 2020; Keršič Svetel et al., 2019; Guštin, 2018) to foreign (Hardman et al., 2021; Sutherland, 2020). The third section contains exclusively Slovenian materials that were used in the creation of the location-based game. Of particular note is the work by the architect Zupančič Kozolci v Zgornjesavski dolini (Hay-racks in the Upper Sava Valley, 2015) and the more recent work *Od stoga do kozuca - manual on the use and maintenance of hay-racks in the Gorenjska region* (2020). Most of the authors or publishers of the latter are from the local area (The Upper Sava Valley Museum, Development Agency for Upper Gorenjska, Tourist Association Dovje-Mojstrana ...).

Tolmin Infopoint: Nik Obid

Thesis title: **State of traffic and developmental opportunities on the Bohinj railway**

Mountain railways are placed in difficult natural environments for the clear reason of overcoming natural obstacles. For this reason, they are characterised by outstanding engineering achievements, which make them of paramount importance both for the transport links between remote Alpine areas and major population centres, and for the image and tourist appeal of the places along them.

All of the above also applies to the Bohinj line, the only real mountain line in Slovenia. The clear positioning of the line in the Alpine-Adriatic region is a clear indication of the complex background to its creation. Although it is most often attributed only tourist and limited regional passenger significance, its potential is much greater. However, as the line passes through towns with a small population and its tourist impact is also limited to some extent, such a perspective would be highly unfavourable to its financial sustainability in terms of renewal and long-term integration into traffic flows. Researchers on its future and present transport situation have largely ignored its status as the only rail link in this part of Slovenia. This is why it is of paramount importance, both for connecting the population of the surrounding area with the centre of the country, and for the freight potential of the line. The latter is much greater

than it is at present, due to its location in the area of traffic flows between the Adriatic Sea and Central Europe.

This is one of the main reasons why I have chosen to look at the transport significance of the Bohinj line. Despite the fact that the line is often described as a remote Alpine line that benefits only local passenger and, above all, tourist traffic, its potential passenger and freight side is completely neglected. Such a development would enable the line and the people living along it to develop competitively socially and economically. The latter would have a number of positive effects on the transport, economic and environmental picture of the region and the country. Precisely because a large part of the line runs through the Julian Alps and thus connects the transportally remote parts of the country (central Soča Valley, Posočje, Bohinjski kot) with the economically more developed parts of Slovenia and other countries, its future transport perspective is of paramount importance for sustainable mobility, transport accessibility, economic development and the residential attractiveness. Of course, its importance is also crucial for the development of sustainable tourism in the Alpine environment, which is particularly sensitive to traffic congestion due to its characteristics.

With this thesis, I wanted to highlight the reasons for the creation and location of this railway in the Alpine-Adriatic area, to present its transport development to date and to analyse its current situation. I have also contextualised potential transport solutions by comparing them with similar rail routes abroad. Based on the situation analysis, field research and international comparisons, I have drawn conclusions that would best contribute to the future development of the Bohinj railway.

Villach Infopoint: Antonia Wildt

Thesis title: **Effects of soil amendments on growth and survival rate of tree seedlings under field conditions**

The study is aimed at understanding the impact of different soil amendments on growth and survival rate of tree seedlings in the context of climate change, focusing on three species European larch, Norway spruce and sessile oak. The motivation for this research stems from the urgent need to mitigate the effects of climate change on forests, particularly in the Alpine region of Central Europe, where temperatures are rising faster than the global average and precipitation patterns are changing (IPCC 2022).

Forests have many essential functions and are particularly important for climate protection as CO₂ sinks, water reservoirs, protection from natural hazards and wood suppliers (Niedermair et al., 2007, Bauer et al., 2023, Kirchmeir et al., 2020). Climate change has a major negative impact on forests, particularly boreal forests (Reich et al., 2022). Due to the fast development of climate change, natural adaptation via genetic processes or natural migration of tree species is impossible (Fortmayer et al., 2009, Niedermair et al., 2007, Lexer and Seidl, 2007). Trees will have to contend with drought stress more frequently (Niedermair et al., 2007). In addition, the spread of harmful organisms / pests is increasing. Rising temperatures reduce the barrier for non-native species. Native species can also spread more both in terms of area (e.g. higher altitudes) and in terms of quantity (Fortmayer et al., 2009). Hoch & Steyrer (2020) show that the amount of damaged wood caused by bark beetles can increase sharply with

rising temperatures and low precipitation during the vegetation period. Accounting for 48 % of the damages, the bark beetle was the main cause of damaged wood in Austria (BML, 2023a).

These developments make sustainable multifunctional forest management (e.g. species and structural diversity, choice of tree species adapted to climate change) increasingly important. Additional stress factors such as emissions, intensive land use or excessive wildlife populations should be reduced (Niedermair et al., 2007, Lexer and Seidl, 2007, Kirchmeir et al., 2020). Forests should be replanted effectively, especially protection forests and large bare areas (Lackner et al., 2023). Natural regeneration is affected by high game impact and tree species must already be present in the area in order to reproduce (Schodterer and Kainz, 2022). Reforestation is necessary when introducing new tree species (e.g. larch in a pure spruce stand) or in nutrient-rich soils, as strong understory vegetation can prevent the supply of light and thus the growth of seedlings (Lässig et al., 1995).

Seedlings must correspond to the field site conditions and especially roots growth is important for survival after planting on the field (Grossnickle, 2012). One potential way to increase the resilience and resistance of planted tree saplings towards stress is the use of soil amendments. Hydrogels, which enhance soil water retention, show mixed results but overall positive trends (Crous, 2017). Nitrogen fertilizers, particularly organic forms like amino acids, offer promising improvements in nutrient uptake and drought resistance (Inselsbacher & Näsholm, 2012; Borghetti et al., 2017).

Main prize finalists (in alphabetical order)

Maria Romana Alvi

Thesis title: **Geothermal potential evaluation of the Turin-Lyon base tunnel**

From 30 to 40% of the final energy consumption of developed and developing countries is associated with the building sector, whose thermal energy requirements for space heating and cooling as well as hot water account from 50 to 80% of the total end-use of energy. Despite the importance of this sector, renewable energy technologies currently supply only a small percentage of global and European heat demand per year (European Union, 2012; IEA, 2012) with most of the heat currently generated by burning fossil fuels. The subsurface represents space and resource of ever-growing importance to meet human activity needs associated with the availability of built environments and energy. Geothermal energy is a good alternative to fossil fuels and its usage is among the most innovative and significant, contributing to environmental protection and providing substantial energy, long term cost savings and minimized maintenance. So-called energy geostructures represent a breakthrough technology in this context. All earth-contact structures that embed a piping circuit with a circulating heat carrier fluid to achieve a heat exchange between the ground and any building or infrastructure represent energy geostructures. They combine the role of the structural support with the role of the thermal energy carrier in a unique technology to serve all types of buildings and infrastructure (Brandl, 2006; Adam & Markiewicz, 2009; Barla & Perino, 2015). During recent years, increasing considerations have been paid on how this heat transfer technology could be extended to tunnels. In comparison with other energy geostructures, energy tunnels are

characterized by a much more extensive linear development so that a bigger surface is in contact with the ground and can be thermally activated. In the case of hot tunnels, where the heat produced internally by fast moving trains or vehicles increases the internal air temperature, the thermal activation of the lining may be adopted also for cooling.

In the presence of high rock overburdens, as occurs in Alpine tunnels, the geothermal resource still represents a partially unexplored potential, and its use can take place by heat exchange both with the rock mass and with the drainage water from the tunnel. Some insights on possible applications were given by Tinti et al. (2017) and Barla & Di Donna (2018) with reference to the Mules Access Tunnel of the Brenner Base Tunnel and the Lyon-Turin tunnel. In case of TBM tunnelling, 'Enertun' (Barla et al., 2019; Insana & Barla, 2020) system can be adopted, with the absorber pipes tied to the reinforcement cage during the concrete segment prefabrication. In the 'Enertun' system, two configurations exist, 'Ground' which comprehends a circuit of pipes installed nearby the extrados of the lining (surface in contact with the ground) and 'Air' where the pipes are closer to the intrados (surface in contact with the tunnel air).

'Enertun Air' can also be adopted in deep tunnels, where the ground geothermal gradient may cause the tunnel internal air temperature to rise above acceptable limits. In these cases, savings on costs of ventilation and cooling system may be obtained.

Stefanie Manas

Thesis title: **The Saas Valley as a beacon region for a sustainable food system in a rural and tourist region**

The study aims to explore and analyze the transformation towards a sustainable food system in the Saas Valley, an alpine region in the Canton of Valais in Switzerland. It aims to provide insights and strategies that can improve the sustainability of the food system in this region. This research is driven by the pressing global challenge of feeding an expected population of nine billion by 2050, within significant environmental constraints.

The current global food system is unsustainable and has significant impacts on environmental and ecological health. It accounts for about 30% of global greenhouse gas (GHG) emissions, drives deforestation, and contributes to biodiversity loss and ecosystem degradation (Wirsam et al., 2020). These environmental impacts exacerbate climate change, species extinction and land degradation, which threaten food security by increasing the frequency of droughts and extreme weather events (Fesenfeld et al., 2023). Transforming the global food system is therefore essential to ensure long-term sustainability and resilience.

Mountain regions are crucial to global food systems because of their ecological diversity, genetic resources and traditional knowledge. They are home to six of the twenty most important plant species, which account for 80% of the world's food supply. In addition, half of the world's biodiversity hotspots are located in mountain areas, providing essential genetic diversity that helps species adapt to changing conditions - a critical factor in the context of climate change (Barchiesi et al., 2022).

Mountain agriculture supports vital ecosystem functions, such as water supply and quality, which are crucial for densely populated lowland areas. Despite their fragile ecosystems,

mountain regions have significant potential to produce high quality food, contributing to food security and livelihoods of mountain populations. This potential also has wider implications for global nutrition and health.

The Canton of Valais has set itself ambitious sustainable development goals for 2030, with the aim of becoming a leading region in terms of sustainability. Given its unique ecological and geographical context within the Alps, the Canton of Valais emphasizes the importance of preserving Alpine biodiversity and ecosystem functions. The region's strategy focuses on achieving energy and food independence and adapting to climate change (Kanton Wallis, 2018).

Given the outlined framework and the important role of alpine regions in sustainable food systems, this study focuses on the Saas Valley as a model region.

Carlotta Sauerwein-Schlosser

Thesis title: Protected areas as drivers of economically sustainable development processes? An Analysis of the French-Italian Border Region of Mont Viso in the Cottian Alps

Protected areas such as Regional Nature Parks and Biosphere Reserves pursue the goal of a holistic, sustainable development. In other terms, they want to integrate nature conservation into economic and social development aspects (Broggi et al., 2017; Friedericke Weber 2013). For peripherally located Alpine regions, which are affected by a loss of population and the dismantling of essential infrastructures (Bätzing, 2015), protected areas therefore initially seem attractive as a means of halting negative development trends (Weixlbaumer et al., 2020). However, acceptance among the population is low. The fear of economic restrictions due to nature conservation prevails (Broggi, 2003; Lindern et al., 2020). Nature preservation is still associated with a kind of "prohibitive character" that excludes the anthropogenic use of natural landscapes (Borsdorf & Jungmeier, 2020; Coy & Weixlbaumer, 2009). Since the population in rural areas is "highly dependent on the use of natural resources for material reasons" (Maschke et al., 2020), the issue is consequently met with resentment, if not conflict, as "local populations are rarely willing to reduce or discontinue the use of local resources and ecosystems". (ibid.) In the Alpine region, the situation is made even more complex by the fact that the specific topography leads to a shortage of space for agricultural use, settlements and transportation (Simmen et al., 2006). The interest of nature protection therefore meets the concern of the local population to have even less of an already limited resource at their disposal.

This initial situation also applies to the study area selected: the Mont viso border region between France and Italy. The territory was long regarded as a transit region of great importance for the Alps (Knauer & Voll, 2005). Today, however, the region has fallen "offside" and is struggling with massive emigration and its associated challenges due to its topographical characteristics as well as resistance on the part of the population to the "modern development" of their biosphere (ibid.). At the same time, the region has been characterized by the intensive promotion of nature conservation activities since the 1980s. In addition to several existing nature reserves in the region, there has been cross-border cooperation between France and Italy since May 2014: the transnational UNESCO Mont Viso Biosphere

Reserve (UBMV). The UBMV is managed by the Parc Naturel Régional du Queyras (PNRQ), which has been operating in the Haute-Alpes department since 1977, and the Parco del Monviso (PNRMV), which was newly established in the Piedmont region in 2016.

The designation of the UBMV is seen as a "success story", as the application for recognition by the UNESCO can be traced back to the early 2000s (CIPRA International, 2019). But the road to achieving this "was not without discussions and resistance at local and regional level" (ibid.). In fact, not all municipalities in the region could be convinced: fearing economic losses, a not insignificant part of the Pellice valley opposed participation in the UBMV.

This raises the question: to what extent do protected areas actually stimulate sustainable economic development processes?

Leonardo Venturoso

Thesis title: **Level of Traffic Stress and Infrastructure Network Analysis for Safe and Accessible Cycling**

The development of sustainable transportation solutions, with a specific focus on cycling, is a key component of urban planning, especially within the European Union. Cycling offers a multitude of benefits, including reduced carbon emissions and improved physical health, as highlighted by Capasso Da Silva et al. (2020). Cities have acknowledged the importance of cycling through legislative initiatives such as Biciplans and Sustainable Urban Mobility Plans, which aim to enhance existing infrastructure for bikes. These initiatives address people's preferences for bicycles as a mode of transportation, with an emphasis on ensuring safety and accessibility in urban and interurban settings (Sustainable Urban Mobility Plans, 2024).

In line with these legislative efforts, my thesis at the University of Trento and Fondazione Bruno Kessler focuses on developing LTS-BikePlan, an AI tool designed to assist Public Administrations in identifying potential road interventions. The tool examines factors influencing the choice between bicycles and cars, considering logistical, environmental, and time constraints. The study aims to quantify the relationship between traffic stress levels (Mekuria et al. 2012) and risk perception by analysing infrastructural conditions such as centrality measures and network high stress gaps, along with qualitative factors like accessibility and accident presence. The case studies of Trento and Bolzano were chosen due to their geomorphological features and the effectiveness of research validation. The mountainous terrain of these municipalities presents challenges in terms of accessibility, which are significant for the broader Alpine region. Understanding these dynamics is crucial for informing regional strategies to improve infrastructure in similarly challenging terrains.