Losing the Ground? Assessing Spatial Planning and Quantitative Soil Protection in the Alpine Region

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The paper deals with the results of the study 'Governance in the field of spatial development and quantitative soil protection in the EUSALP region'. The aim of the network analysis was to identify and understand the significant networks and spatial planning systems that influence quantitative soil conservation at different levels, with a focus on the national/cross-border level. The study area was the Alpine macro-region, based on the corresponding EU-Strategy for the Alpine Region (EUSALP). The study was carried out using a participatory approach, involving numerous experts on spatial planning and soil conservation from all Alpine countries. In the present paper, the case of Austria is shown as an example. The project has revealed that instruments dealing with soil conservation issues are available, but implementation is lacking, and binding definitions and quantitative guidelines are missing.

1 Introduction

In any mountain region, the topography forces people to organise themselves in small-scale institutions. Therefore, the main challenge, is to achieve a joint management of a mountain region, especially when it comes to the topic of soil. Soil is one of the scarcest resources in the mountains, as a wide variety of uses is concentrated within a small area: agriculture, forestry, settlements, tourism, nature conservation. The amount of soil that can actually be used if one takes away the too steep, rocky, barren areas is limited. This also makes defining a suitable soil management regime a major challenge if the diverse functions of mountain regions are to be maintained in a time of rapidly changing climatic, economic and social factors (Bugmann et al. 2007).

According to Salata (2014), land use change in the Alpine regions is characterised on the one hand by renaturation processes, but on the other hand by settlement expansion with the associated occupation of low-valley areas. The latter is of great concern in the Alpine countries (second only to soil erosion) due to soil sealing. "Sealed areas are lost for uses such as agriculture or forestry, while ecological soil functions are severely impaired or even prevented (e.g. soil acting as a buffer and filter system or as a carbon sink). In addition, surrounding soils can be affected by changes in water flow patterns or habitat fragmentation. Current studies suggest that soil sealing is nearly irreversible." (European Soil Data Centre 2020).

The availability, comparability and topicality of soil data is quite diverse. Still, some figures can provide rough insights into the magnitudes. In Slovenia, for example, the soil sealing rate was 8.9 ha/per day for the four-year period 2008-2012 (Lampič & Repe 2013). The daily increase of surfaces for settlement and traffic areas in Austria in 2019 was 12.1 ha/day on average (Umweltbundesamt 2020a). In the period of 2015-2018, Germany's average land take rate for transport and settlement areas amounted to 56 ha/day (Umweltbundesamt 2020b), for Bavaria, the land take rate was 10.8 ha per day in 2019 (Bayer. Staatsministerium für Umwelt und Verbraucherschutz 2020). It is estimated that if the average trend of the previous five years

is maintained, the originally specified target of 30 ha/day, which was supposed to be reached by 2020, will not be achieved until 2030 (Umweltbundesamt 2020b). In Italy, land consumption between 2008 and 2013 added up to 55 ha/day on average. In 2013, Lombardy (together with Veneto) was one of the regions with the highest land take (9.6-12.2 % of consumed land in the entire area) (ISPRA 2015). However, taking the population of more than 10 million inhabitants into account, it is comparable to other regions in Italy in terms of soil sealing per inhabitant. Between 1985 und 2009, settlement areas in Switzerland have grown by 0.75 m² per second (BAFU 2017), or 6.48 ha/day.

Though recent data for many countries show that the increase in the amount of land used for settlement and transport areas has been noticeably slowing down, soil consumption and soil sealing is still a major threat in the EUSALP countries and still "remains at a high level" (Badura et al. 2016a). However, "positive land use trends can be observed in Austria, […], France, […]; Italy, […] Slovenia […], where land take is […] lower than population growth" (Prokop et al. 2011). Nevertheless, there are regional differences to be recognised. Referring to BAFU (2017), Alpine areas like the Central Alps, Southern and Northern Alps have experienced a slower increase in sealing rates than the lower midlands, yet it is a crucial fact that in these Alpine areas sealing is usually highly concentrated in valleys and regions with higher population densities. The Alpine Convention and in particular its Protocol on Soil Conservation as well as several projects funded under the Alpine Space Programme have committed themselves to counteracting this problem (Jiricka et al. 2014).

This paper presents the results of a study by Zollner et al. (2018), which analysed the situation of governance mechanisms in the fields of spatial development and quantitative soil protection by taking stock of existing structures and their interaction, describing best practice examples and identifying bottlenecks. In particular, the study explored spatial planning aspects and the strategic potential for improving specific governance aspects, such as transversal cooperation, conflict management and involvement of emerging relevant actors. For this purpose, a network analysis was performed which can represent the small-scale structures in the Alpine region at local, regional and macro-regional level.

The study was carried out in the frame of the project "AlpGov – Implementing Alpine Governance Mechanisms of the European Strategy for the Alpine Region" of the Alpine Space programme. The project aimed at supporting effective and efficient implementation of the EUSALP in a "systematic transnational approach through designing and testing appropriate governance structures and mechanisms mainly on the level of the 9 EUSALP Action Groups (Alpine Region 2016). The Permanent Secretariat of the Alpine Convention, together with the Federal State Carinthia/Austria, leads the Action Group 6 dealing with the topic 'Preservation and valorisation of natural resources, including water and cultural resources". In the period 2016-2019 this Action Group focused its activities on three sub-topics, one of which being "Spatial development and soil conservation". The governance study contributed to the implementation of this sub-topic.

2 Study Area

The area of investigation was the Alpine macro-region, based on the corresponding EU-strategy EUSALP. This macro-region encompasses 48 European regions in 7 countries (Austria, France, Germany, Italy, Liechtenstein, Slovenia, Switzerland) in and around the Alps, including several metropolitan centres with together more than 80 million inhabitants. The aim of the EUSALP is to promote the sustainable economic and social prosperity of the Alpine region through growth and job creation by improving its attractiveness, competitiveness, and connectivity, while at the same time preserving the environment and ensuring healthy and balanced ecosystems. For more details on the EUSALP region, please see European Commission (2015) and Chilla et al. (2018).

The EUSALP is established in a region where cooperation schemes and institutions with different spatial perimeters are already in place (Figure 1).

Concluded between the eight countries of the Alpine arc (Austria, France, Germany, Italy, Liechtenstein, Monaco, Slovenia, and Switzerland), as well as the EU, the *Alpine Convention* aims at securing the protection and sustainable development of the Alps. It came into force in 1995 and is binding under international law. This marks the first time a transnational mountain area has been considered a common territory facing common challenges. The Alpine Convention acts through organs, including decision-making and executive bodies, a permanent secretariat, and several working groups. In the period 2013 -2019 one of them was dedicated to the EU-strategy EUSALP. *The Alpine Space programme* is a European transnational cooperation programme for the Alpine region, which provides funding for projects under the European Territorial Cooperation (ETC) objective, has a much broader territorial reach than the Alpine Convention. It covers an area almost twice as large i.e. 390 000 square kilometres and five times as populous.

The EUSALP's territorial scope is even larger and includes regions with major cities located outside the "core Alpine area". This corresponds to the approach taken in the Alpine Space programme. Indeed, the EUSALP's philosophy is to "ensure mutually beneficial interaction between the mountain regions at its core and the surrounding lowlands and urban areas, considering, in a flexible way, the

Figure 1: Overview of the areas of the EUSALP region, the Alpine Space Programme, and the Alpine Convention (Source: EUSALP Action Plan, European Commission, Brussels)

functional relationships existing between them" (European Union, 2019).

3 Methods

The objective of the network analysis of the soil governance system in the Alpine region was to identify and to understand the significant networks and the system of spatial planning influencing quantitative soil conservation on different levels, with a main focus on the national/cross-border level.

Given the number of countries involved, it became evident that an experience-based approach was needed to acquire the relevant information. In a first step, instruments and tools were collected by means of an inquiry among selected national experts. Instruments and tools are to be seen as the *"aggregated political and social will"* regarding spatial development and its handling of soil topics. It provides the practical, institutionalised, and legal framework for any activities taking place on the ground. It therefore serves as the starting point for further considerations about the mapping of stakeholders and the analysis of their interrelations. The relevant stakeholders for each instrument were collected based upon the survey of instruments. This was done during the inquiry referred to above. The different categories of stakeholders, classified as "decision-makers", "executers" and "influencers" demonstrated the prevailing importance of legislative and executive bodies on all levels.

Based on the mapping of instruments and stakeholders, which was undertaken separately for all countries/regions involved, the focus was given to comparative governance aspects. Quantitative soil conservation is very much bound by a country's internal planning and decision-making procedures. Although in most cases, the regional or national level is formally the main "steering" level, the local level is often regarded as the level with the strongest impact on soil consumption. Other levels, such as the European or macro-regional levels are of lesser importance.

Furthermore, an expert workshop was held to discuss the preliminary results concerning relevant instruments and stakeholders and to examine in detail the "relationships between instruments and stakeholders" and their impacts on quantitative soil conservation. In in-depth-interviews, open questions and further requirements were identified, which completed the network picture.

The relationships between the different levels, instruments and stakeholders with different roles can be very complex (see Figure 2). The subsequent network analysis provided a clear picture of these relationships and showed where the levers need to be turned in the future to prevent further settlement sprawl and soil sealing in the Alpine region.

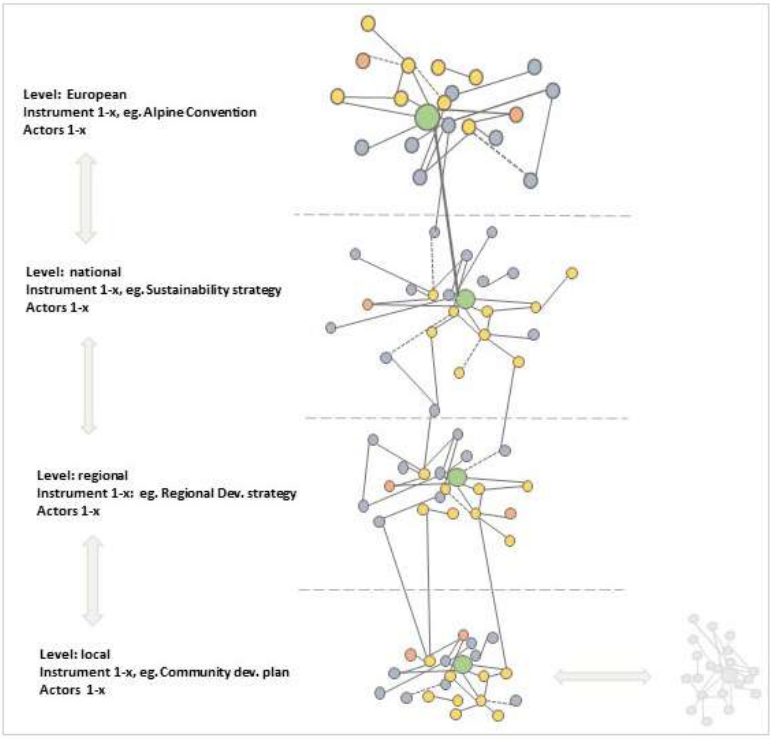


Figure 2 : Overview of the complexity of governance systems

The figure shows an example of how governance in a certain field can be depicted…

…within and between a. different hierarchies (levels) b. instruments (clouds) c. actors (dots);

…having different roles, e.g. a. 'decision-maker' (green) b. 'executer' (blue) c. 'influencer' (yellow);

…and having certain kinds of interrelations: from 'very relevant, strong, formal, binding' (thick lines) to 'little relevance, weak, informal, non-binding' (thin lines).

Source: Authors

4 Selected results

The structures and processes that determine how power is exercised and responsibility is assumed, how decisions are made and how different stakeholders participate in the development of the area concerned vary from country to country. In this section, Austria will serve as an example for the presentation of the importance of vertical hierarchies in the Alpine states and regions. This part is followed by a comparison between countries regarding the instruments and the stakeholders involved in spatial planning.

4.1 Vertical Hierarchy of Spatial Planning Elements-The Example of Austria

For each participating country and region, a template was completed. The result of the Austrian case study can be seen in Figure 3, where all spatial planning laws, guidelines, instruments and stakeholders and their interdependencies are arranged in a vertical hierarchy from the macro-regional to the local level. Chilla et al. (2018; ESPON project Alps2050) performed an analysis of governance at the Alpine level, and, interestingly, also stressed the need to consider "domestic" levels (i.e. regional and national) in terms of transnational spatial planning and development issues.

4.2 Analysis of the comparative governance aspects

The following chapter provides an overview of the instruments and stakeholders identified as having either a medium, high, or very high impact on soil consumption at different levels in the EUSALP countries as well as an overview of the main similarities and differences between the countries identified in the survey. Although certain aspects might be simplified and aggregated, this chapter allows certain conclusions to be drawn on trends.

Instruments: Importance, similarities, and differences

Quantitative soil conservation is very much linked to the internal planning and decision-making procedure of a country. The European level has only been mentioned a few times for having instruments that could possibly have an impact on soil protection. The Territorial Agenda (TA) and the Urban Agenda for the EU are of a strategic nature and have the character of "recommendations", so they are not considered to be as influential in the context of national legislation or implementation procedures with regard to quantitative soil conservation.

At the macro-regional scale, it has been said that, for quantitative soil conservation, the Alpine Convention with its Protocols on Spatial Planning and on Soil Conservation containing legally binding provisions is the only instrument to be considered. Nevertheless, according to the experts involved its impact could be considerably improved and is limited to its scope of application. In all countries except Liechtenstein, there are significant areas that do not fall

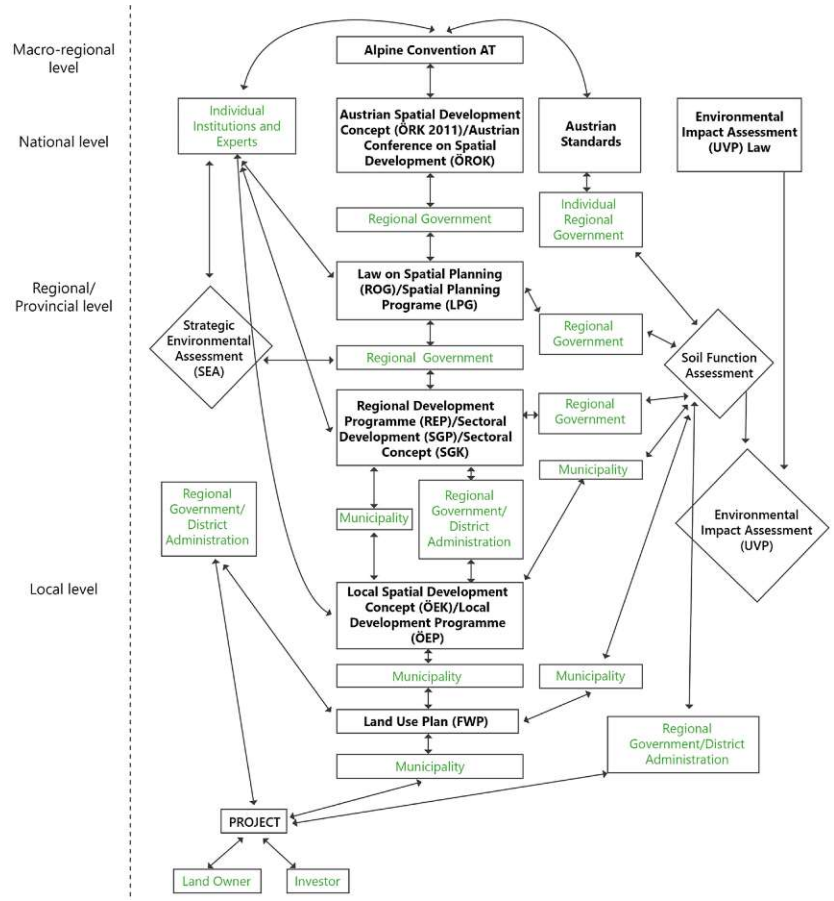


Figure 3 : Overview of the planning system with respect to significant instruments in Austria (output of the expert workshop) Legend: Spatial Planning Laws and Guidelines (black), Stakeholders (green), Environmental Planning Tools (diamond shape)

Source: Authors

within the scope of application of the Alpine Convention. Apart from the Alpine Convention, the EUSALP, the Alpine Space programme and the ARGE Alp have a certain influence on relevant projects, but there is no clear assessment of their impact.

Most countries except Liechtenstein have laws on spatial planning which form the basis for other levels and other planning instruments. Again, depending on which level is the "strongest", the main legally binding regulation regarding soil consumption is the relevant law at either the national or regional level.

Stakeholders: Importance, roles, and interactions

Basically, decision-making power rests with either the national/federal or regional/provincial parliaments (legislative power) and governments (executive power).

Political groups play an important (though reluctantly evaluated) role at all levels. It can be observed that while regions have the same legal frameworks, they have different approaches. The sustainable use of soil ("soil-friendliness") (or the opposite) is often associated with the policy approach of political parties.

Administrations at all levels are the main executers. Their influence on steering quantitative soil conservation by applying laws and regulations can be quite considerable. Depending on the national pre-settings and "handling" approach, their scope for action (freedom to act) seems to range from quite low (e.g. Switzerland) to quite high (e.g. Austria).

The municipalities (mayor together with the municipal council) play a significant role more or less throughout all the countries and regions involved, when it comes to the elaboration and implementation of spatial planning tools on the ground. Depending on the pre-settings and the binding character of the instruments at higher levels, they have considerable leeway. The strong position of municipalities, often allied with associations, can greatly influence the higher levels, for example in case of new regulations or the adaptation of existing ones.

Throughout almost all the countries economic chambers and industrial associations, farmers' unions and investors/ "big players" have an important role in terms of steering soil consumption, in particular at the regional and national levels.

NGO's or environmental organisations mainly play a role at the regional or national level. Their influence appears to be quite high and is probably strongest in Switzerland. CIPRA International is seen as the main influencing organisation at the macro-regional level.

Citizens in all countries have basic rights of participation, especially at a local level, and in Switzerland and Germany even via local referendums, which to a certain extent are

binding upon politicians. In this connection, public opinion seems to play a significant role in Switzerland, exemplified by the fact that the current and very strict law on spatial planning was approved as a result of a national referendum.

As Marzelli & Lintzmeyer (2015) point out, in terms of relevant categories of stakeholders with regard to transnational needs, the public sector seems to be the most important category, with "public bodies", "ministries", "spatial planning authorities", "public agencies" and "municipalities" being the highest-ranked, although closely followed by "NGOs" and "networks".

Comparison between the countries

The countries and regions have different "levels of importance" and vertical hierarchies regarding the implementation of soil-related issues in spatial planning. As simplifications are debatable, and due to the different functions of the levels (legislative and executive) the comparisons are not rigorous, Figure 4 gives a rough idea of the levels on which quantitative soil aspects exert their highest impact (either positive or negative). The vertical scope (continuity of results from the upper levels down to the lower levels) can be considered in different ways. While some of the countries seem to follow a strong, stringent, and rather top-down approach (Switzerland, Slovenia, France, Liechtenstein, partly Italy), the links between levels are less distinct in other countries (Austria, Germany, partly Italy).

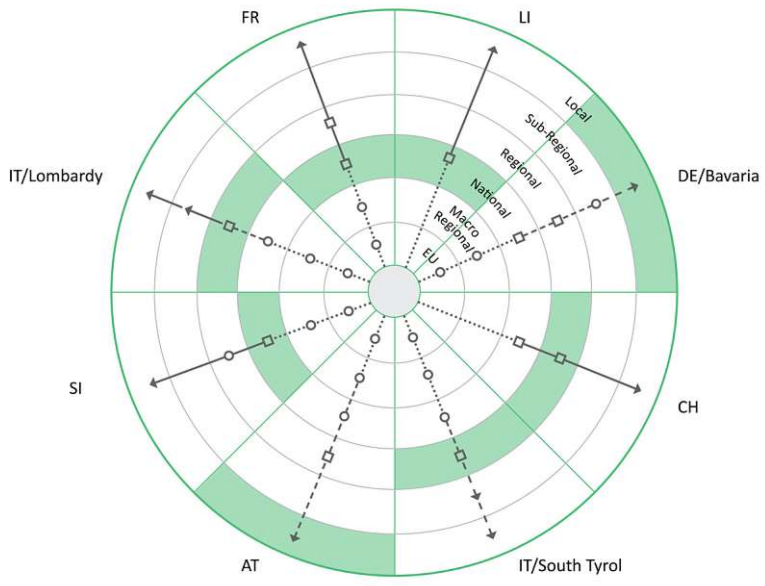
The 'main" level at which decisions on quantitative soil conservation should have their maximum impact again varies considerably from country to country. However, in countries with a strict top-down approach, the 'main" level is the national or regional level, while in other countries the local level has the greatest influence.

Apart from Austria, where the Alpine Convention is directly applicable under certain conditions, the importance and consideration of the macro-regional and the European levels do not really affect lower levels of spatial planning or quantitative soil-conservation issues in any direct and significant way. However, this does not prevent soil aspects of these upper levels being integrated at the national and regional levels (knowingly or unknowingly).

The local level in Austria and Germany/Bavaria appears to be quite strong, as it has significant decision-making leeway. This is perhaps because there is no stringent vertical hierarchy. However, in Germany and Austria spatial planning legislation lies very much within the power of the single regions, which have considerable "control potential". One notable particularity is that some instruments either directly affect all other levels (Alpine Convention in Austria), or skip a level (the Building Code in Germany at the national level is directly binding upon the local level). Furthermore, whereas in all other countries the highest-ranked level coincides with the main regulatory instruments/laws, this is not the case in Austria and Germany/Bavaria. The executive power seems to "overrule the rules".

In Italy and the regions of Lombardy and South Tyrol, the regional level is said to have the strongest influence on the steering of quantitative soil conservation. This is partly caused by the lack of national regulations. Also, Pütz et al (2011) highlight the fact that the provinces/ regions in

Figure 4: Levels of importance and vertical hierarchies in the Alpine states and regions



Coloured areas *mark the level of highest influence/effect/ control potential, are highest ranked*
Different lines *provide information on vertical impact continuity from level to level:*
dotted – low/strategic character;
hatched – medium/indirect/recommendatory character/'soft laws';
continuous line – strong/stringent/hierarchical/legally binding character).
Different points *on the lines at each level indicate the existence of the levels as well as the predominant character of their instruments:*
circle: strategic instruments/soft laws;
squares: legally binding instruments/laws;
triangle/arrow: planning instruments/programmes

Italy have more autonomy than those in other countries. The regional level (cantons) also plays the most influential role in Switzerland.

In Slovenia, France and Liechtenstein, the national level provides a highly binding framework for the other levels and has therefore been ranked highest. The lower levels must comply strictly with the regulations issued by the higher levels.[1]

5 Conclusion

Many studies have already shown the strong need to improve practices in soil conservation and/or spatial planning, and also recommend various concepts and measures to mitigate soil sealing and other negative consequences (see Marzelli et al 2011, Huber 2012, Artman 2014, Nared et al 2015, Badura et al 2016b, etc.).

The project has revealed that instruments to address soil conservation issues exist in principle, but there is a lack of implementation and an absence of binding definitions. It is recommended that the appropriate main strategic and steering levels (appropriate regional and/or national level) provide specific, binding targets for quantitative soil consumption for the lower levels. This is also an important conclusion of the in-depth review on the subject "Economical use of soil" performed by the Compliance Committee of the Alpine Convention, which has been endorsed in 2019 by the Alpine Conference, the political decision-making body of the Convention meeting at ministerial level. At the same time, participatory approaches should be improved in particular at the municipal level, where soil consumption takes place. Different approaches and programmes are thus needed to enhance knowledge and raise awareness for the scarcity of the resource soil. There is therefore a need to foster top-down and bottom-up approaches at the same time. Though there are some states which seem to have a consistent system of coordination, at least between some levels, sectors or regions, a higher degree of adjustment is generally needed. However, improved multi-level, cross-sectoral and trans-boundary coordination will require further developments in terms of a network hub incorporating the relevant capacities and competences. Furthermore, activities should be implemented to make "hidden" plans, procedures, and costs transparent, and to support mitigating and inclusive approaches to spatial planning and soil conservation. The study also revealed a need for action in research and monitoring. An important future research question could address the implementation of efficient and comparable monitoring and indicator systems in the field of quantitative soil conservation.

The results of the study have already led to further actions and served as a scientific basis for the formulation of the declaration "Sustainable Land Use and Soil Protection – Joining Forces for Nature, People and the Economy", which was developed and adopted by the EUSALP Action Group 6´. After that the declaration underwent a public consultation to collect the feedback of interested institutions and civil society organizations. Finally, the political coordination process led to the support of the declaration by 20 Alpine regions and 6 states. The representatives of the states and regions in the territory of the EUSALP agreed to cooperate towards sustainable land use and healthy soils through several good practices. These practices partly derive from the recommendations of the study such as "Establishing and strengthening regional, national and cross-border cooperation" and "Encouraging awareness raising, capacity building and experience exchange on sustainable land use and soil protection".

The study addresses questions that go far beyond the Alps and adjacent areas. Many mountain ranges in the world, also in arid, tropical and moderate climates, face challenges in protecting soils. The focus on governance, as emphasised by the Alpine Convention, can be seen as an Alpine contribution to an international discussion.

[1] For further comparative aspects of spatial planning instruments between the Alpine countries, such as consideration of climate change in spatial planning, soil protection in the legal system and existing soil management tools please see Pütz et al (2011) and Huber (2012).

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