

TEXTE

56/2018

Quo vadis soil protection in the Alps?

Assessment of the Alpine Convention Soil Conservation Protocol and preparation/ implementation of an international conference

Final report

TEXTE 56/2018

Project No. (FKZ) 3715712010

Report No. (UBA-FB) 002476/ENG

Quo vadis soil protection in the Alps? Assessment of the Alpine Convention Soil Conservation Protocol and preparation/ implementation of an international conference

Final report

by

Marianne Badura
blue! advancing european projects GbR, Munich

Nina Kuenzer
blue! advancing european projects GbR, Munich

Dr Gertraud Sutor
LAND-PLAN Büro für landschaftsökologische Gutachten und Planung,
Ebersberg/Munich

Dr Roland Kals
arp - alpen.raum.planung, Salzburg

Assoz. Prof. Dr Sebastian Schmid
Universität Innsbruck, Institut für Öffentliches Recht, Staats- und Verwaltungslehre

On behalf of the German Environment Agency

Imprint

Publisher

Umweltbundesamt
Wörlitzer Platz 1
06844 Dessau-Roßlau
Tel: +49 340-2103-0
Fax: +49 340-2103-2285
info@umweltbundesamt.de
Internet: www.umweltbundesamt.de

 [umweltbundesamt.de](https://www.facebook.com/umweltbundesamt.de)

 [umweltbundesamt](https://twitter.com/umweltbundesamt)

Report performed by:

blue! advancing european projects GbR
Brienner Straße 48, Hofgebäude 2
80333 München
Germany

Report completed in:

October 2016

Edited by:

Section II 2.7 Soil Quality and European Soil Protection
Dr Frank Glante

Publication as pdf:

<http://www.umweltbundesamt.de/publikationen>

ISSN 1862-4804

Dessau-Roßlau, July 2018

The responsibility for the content of this publication lies with the author(s).

Abstract: Assessment of the Alpine Convention Soil Conservation Protocol

In many countries, the Alpine Convention's Soil Conservation Protocol is a requirement "neglected" by public administration and by society, as accountability is spread across many fields of legislation. Especially in the Alps, soil conservation is of great significance, as soil is a limited, non-renewable and endangered resource. During the German Presidency of the Alpine Convention (2015-2016), an assessment of the implementation status of the Soil Conservation Protocol was performed by the present study. Various substantive aspects of soil conservation were considered in the assessment. The following thematic areas were worked out in detail by an online expert survey, an international symposium and a literature review: risk assessment / erosion, qualitative soil protection and soil functions, mountain farming, forestry, wetlands, moors, qualitative soil protection / land take, as well as international / Alps-wide cooperation.

In this context, it should be kept in mind that, while in the current study general statements are made for all Alpine countries, due to the low number of responses from France and Italy in the expert survey further investigations need to be made in the future in these countries. The results of the survey have been broadly confirmed during the final Alps-wide soil symposium and highlight clearly the implementation shortcomings of the Soil Conservation Protocol: Although the Soil Conservation Protocol acts as overarching legal instrument, significant differences exist regarding its implementation and application, in particular on national levels. The exchange between experts (committees) of the Alpine countries and regions does not take place on a regular basis. As a result, substantial differences arise in the

consistently applying its articles, or by implementing concrete measures, initiatives and projects. The study's key findings can be summarised in the following thematic recommendations:

- ▶ development of a shared monitoring approach and improvement of the necessary legal implementation,
- ▶ integration and reconciliation of the objectives of the Soil Conservation Protocol with the globally adopted sustainable development and soil conservation goals,
- ▶ linking soil conservation topics with climate protection effects, including in communication,
- ▶ increase in common efforts to reduce land take,
- ▶ development of a frequent and regular exchange between soil conservation experts of the regions and countries as well as
- ▶ information and awareness-raising for the wider public and important stakeholder groups, such as agriculture, forestry or the municipal level.

All contracting parties of the Alpine Convention are actively encouraged to carry out respective communication activities as well as to undertake active information exchange with existing organisations (e.g. ELSA, Global Soil Partnership).

In the framework of the macro-regional strategy for the Alps (EUSALP), Action Group (AG) 6, which is the most recently launched AG, is responsible for the following goal: "To preserve and valorise natural resources, including water and cultural resources". AG6 coordinates the ongoing efforts between the different regions regarding soil conservation in the Alps within the framework of EUSALP. The Region of Carinthia and the Permanent Secretariat of the Alpine Convention lead AG6, so that a direct link between EUSALP and the Alpine Convention is provided.

Kurzbeschreibung: Bilanzierung des Protokolls Bodenschutz der Alpenkonvention

Das Bodenschutzprotokoll (BodP) der Alpenkonvention ist in vielen Ländern eine „vernachlässigte“, weil auf viele Rechtsbereiche verteilte, Anforderung an die Verwaltung und die Gesellschaft. Bodenschutz ist aber gerade in den Alpen von großer Bedeutung, da es sich um eine begrenzt vorhandene und vielfach gefährdete Ressource handelt. Während der deutschen Präsidentschaft der Alpenkonvention wurde mit der vorliegenden Studie eine Bilanzierung zum Stand der Umsetzung des Bodenschutzprotokolls gemacht. Dabei wurden verschiedene inhaltliche Aspekte des Bodenschutzes berücksichtigt. Im Einzelnen wurden die Themenbereiche Risikobewertung / Erosion, Qualitativer Bodenschutz und Bodenfunktionen, Berg-Landwirtschaft, Forstwirtschaft, Feuchtgebiete, Moore, Quantitativer Bodenschutz / Flächenverbrauch sowie Internationale / Alpenweite Zusammenarbeit mittels einer Expertenbefragung und Literaturrecherche bearbeitet. Dabei ist zu beachten, dass hier zwar generelle Aussagen für alle Alpenländer getroffen werden, aufgrund geringer Rückmeldungen aus Frankreich und Italien für diese beiden Länder ggf. aber noch weiterer Recherchebedarf besteht. Die Ergebnisse der Untersuchung wurden bei der die Studie abschließenden Bodenschutztagung weitgehend bestätigt und machen deutlich, wo die Defizite bei der Umsetzung des Bodenschutzprotokolls liegen: Das Bodenschutzprotokoll fungiert zwar als übergeordnetes Rechtsinstrument, es gibt aber aus vielfältigen Gründen große Unterschiede in der Umsetzung und Anwendung, v.a. auf nationalstaatlicher Ebene. Der Austausch zwischen den Experten(-gremien) der Alpenländer und Regionen findet nicht regelmäßig statt, so dass es zu deutlichen Unterschieden in der Auslegung und Anwendung des BodP kommt. Hinzu kommt, dass die Datengrundlagen zu Bodenschutz relevanten Themen nicht einheitlich bzw. harmonisiert erhoben werden, was die Vergleichbarkeit von Aussagen zum Status quo weiter erschwert. Ein gemeinsames Monitoring, wie es Art. 20 des BodP vorsieht, findet derzeit nicht statt.

Hauptanliegen der Studie war es daher die Möglichkeiten auszuleuchten, wie auf Basis der bestehenden Rechtslage in den einzelnen Alpenländern die Umsetzung von Bodenschutz in Form von Rechtsanwendung, konkreten Maßnahmen, Initiativen und Projekten weiter voran-zubringen wäre. Die wichtigsten Erkenntnisse aus der Studie lassen sich in thematisch gegliederten Empfehlungen zusammenfassen:

- ▶ Aufbau eines gemeinsamen Monitorings und Verbesserung der rechtlichen Umsetzung,
- ▶ Einbindung und Abgleich der Ziele des BodP mit den global verabschiedeten Nachhaltigkeits- und Bodenschutzzielen,
- ▶ Verlinkung von Bodenschutzthemen mit Klimaschutzeffekten, auch in der Kommunikation,
- ▶ gemeinsame Anstrengungen zur Reduzierung des Flächenverbrauchs,
- ▶ Aufbau eines regelmäßigen Austausches zwischen den Bodenschutzexperten der Regionen und Staaten sowie
- ▶ Information und Bewusstseinsbildung für die breite Öffentlichkeit und wichtige Akteursgruppen wie Land- und Forstwirtschaft oder die kommunale Ebene.

Alle Vertragsparteien der Alpenkonvention sind hier aktiv gefordert, entsprechende Kommunikationsmaßnahmen auf den Weg zu bringen und zu unterstützen sowie den aktiven Austausch mit bestehenden Organisationen (z.B. ELSA, Global Soil Partnership) zu suchen.

Im Rahmen der makroregionalen Strategie für den Alpenraum (EUSALP) gibt es seit kurzem die sog. ‚Action Group‘ (AG) 6, zuständig für das Thema „To preserve and valorise natural resources, including water and cultural resources“, die innerhalb der EUSALP die Arbeit zwischen den verschiedenen Regionen zu Fragen des Bodenschutzes in den Alpen koordiniert. AG6 wird geleitet vom Land Kärnten und dem Ständigen Sekretariat der Alpenkonvention, so dass eine direkte Verschränkung zwischen EUSALP und Alpenkonvention gegeben ist.

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List of abbreviations

CO₂	Carbon dioxide
COP	Conference of the Parties
EU-ETS	EU Emissions Trading Scheme
F-gases	Fluorinated greenhouse gases
FTIP	Federal Transport Infrastructure Plan
GHG	Greenhouse gas
HGV	Heavy goods vehicle
ICAO	International Civil Aviation Organization
IMO	International Maritime Organization
KSBV	UBA-study Klimaschutzbeitrag des Verkehrs bis 2050 [UBA, 2016a]
NDC	Nationally Determined Contributions (in Paris-Agreement)
NEDC	New European Driving Cycle
N₂O	Nitrous oxide (laughing gas)
PJ	Petajoule (energy measuring unit)
PtG	Power-to-Gas (any power-based gaseous fuels)
PtL	Power-to-Liquid (any power-based liquid fuels)
RDE	Real Driving Emissions
TWh	Terawatt hours (measuring units for energy)
UNFCCC	United Nations Framework Convention on Climate Change
WLTP	Worldwide Harmonized Light-Duty Vehicles Test Procedure

Summary

In many countries, the Alpine Convention's Soil Conservation Protocol is a requirement "neglected" by public administration and by society, as accountability is spread across many fields of legislation. Especially in the Alps, soil conservation is of great significance, as soil is a limited, non-renewable and endangered resource. During the German Presidency of the Alpine Convention (2015-2016), an assessment of the implementation status of the Soil Conservation Protocol was performed by the present study. Various substantial aspects of soil conservation were considered in the assessment. The following thematic areas were worked out in detail by an online-expert survey, an international symposium and a literature review: risk assessment / erosion, qualitative soil conservation and soil functions, mountain farming, forestry, wetlands, moors, qualitative soil conservation / land take, as well as international / Alps-wide cooperation.

In this context, it should be kept in mind that, while in the current study general statements are made for all Alpine countries, due to the low number of responses from France and Italy in the expert survey further investigations need to be made in the future in these countries. The results of the survey have been broadly confirmed during the final Alps-wide soil symposium and highlight clearly the implementation shortcomings of the Soil Conservation Protocol: Although the Soil Conservation Protocol acts as overarching legal instrument, significant differences exist regarding its implementation and application, in particular on the individual national levels. Exchange between experts (committees) of the Alpine countries and regions does not take place on a regular basis. As a result, substantial differences arise in the interpretation and application of the Protocol. In addition, datasets for topics relevant to soil protection are not collected in a uniform and consistent way, which further complicates the comparability of statements regarding the status quo.

The main purpose of the study was, therefore, to describe the possibilities for promotion and implementation of soil protection in the Alpine countries by consistently applying its articles, or by implementing concrete measures, initiatives and projects. The study's key findings can be summarised in the following thematic recommendations:

Development of a shared monitoring approach for a comprehensive and extensive evaluation of soil and its functions

Common data collection for soil monitoring, as required under Article 20 of the Soil Conservation Protocol, is currently not being employed. Although the individual countries acquire soil data, coordination regarding the type and scope of data as well as the definition of interfaces that would allow a minimum exchange on certain parameters are missing.

The provision of evaluation bases is required for the areas of qualitative soil conservation, risk assessment and erosion, e.g. by high-resolution hazard maps, trainings, work aids and display in land cadastres. The same applies for the respective data and maps for soil function assessment (according to Art. 1 (3) SCP, Art. 11 SCP). Here, guidance on how to conduct assessment in spatial planning is clearly necessary. For the soil-conserving management of Alpine pastures, a specification of Good Agricultural Practice, e.g. by collating examples of best practice, would be suitable. The necessary information could be collected by site mapping and processed by erosion hazard maps (inter alia mapping of forest and mountain pastures). The results should be made extensively and easily accessible for experts and laypersons, for instance through a Web-GIS application. Respective target values and measures should be more clearly defined in the SCP.

Improvement of legal and administrative implementation

The consulted experts identified insufficient legal implementation of the SCP or its incomplete implementation in all Alpine countries and regions. This concerns different aspects of soil conservation, depending on the legal system and the division of responsibilities among ministries/units of the individual countries. Two suggestions are proposed to improve the situation:

- ▶ Substantive specification in the member states with overall, transnational coordination – versus –
- ▶ Utilisation of the SCP with its targets simply as a guideline for national implementation, with substantive specification at national level based on other provisions.

An improvement of enforcement could be partially achieved “merely” through more rigorous interpretation and implementation of existing regulations in concert with further interests. In addition, the official and administrative enforcement of soil conservation’s legal provisions can be supported by an improved exchange on SCP implementation between experts and administrators.

Integration and reconciliation of the objectives of the Soil Conservation Protocol with the globally adopted sustainable development and soil conservation goals

The sustainability goals agreed in 2015 by the United Nations list for the first time binding soil protection as one of the Sustainable Development Goals (SDGs) (*“Preserving diverse forms of life on land requires targeted efforts to protect, restore and promote the conservation and sustainable use of terrestrial and other ecosystems. Goal 15 focuses specifically on managing forests sustainably, restoring degraded lands and successfully combating desertification, reducing degraded natural habitats and ending biodiversity loss.”*).

Based on SDG 15, it is evident that land use must be better aligned in the future with the maintenance of soil fertility and the ecological functioning of soils. At the same time, harmful farming methods must be curtailed. For example, a rethinking is required with regard to soil compaction by agricultural use or phosphate and nitrate contamination in soil and groundwater due to excessive livestock on existing surfaces (manure problem). These aspects regarding soil conservation can indeed only be influenced through exchange and in cooperation with agriculture. The corresponding political guidelines must be regulated EU-wide and in a cross-departmental manner (inter alia in consultations on the common agricultural policy for the funding period 2021-2027). In practice, farmers must be informed and educated by targeted training measures, soil conservation consulting and field visits.

The general public needs to be informed, using the vehicle of “healthy food”, about the links between food production and soil conservation as well as soil fertility. Moreover, diverse awareness-raising activities for the general public are necessary in order to develop a general understanding of soil-related issues.

Linking soil conservation topics with climate protection effects, including in communication

Soil conservation is based on the capacity for CO₂ storage by moors and wetlands that is simultaneously conducive to climate protection. This applies specifically to the protection of fen soils, which are in many cases under (intense) agricultural use. These soils contribute significantly to climate protection, which has been, until now, inadequately addressed in the SCP. Within the framework of the Alpine Convention, linkage between soil protection activities and the most recently formulated climate protection goals is possible. In order to attain these goals, intensive dialogue with agricultural stakeholders (and further land users) is necessary in order to

ultimately achieve forms of land use that are conducive to the protection and preservation of soils as well as of wetlands and moors. The necessary measures include, for instance, the adaptation of agri-environmental measures, the training of farmers and foresters, the re-definition of Good Agricultural Practice and many more.

Common efforts to reduce land take

Despite different assumptions regarding the reduction of land take, the appropriation of undeveloped areas remains at a high level in all Alpine countries. Therefore, substantial efforts are still necessary in order to attain the objectives set in this domain. The conclusion by experts, who are highly sceptical about the impact of standard but outdated tools (finding them “too soft”), is that land-use and development planning as well as strategic environmental assessment need to be particularly stressed in this context. There is further criticism with regard to the insufficient use of available instruments and the fact that building and planning law is largely under the jurisdiction of municipalities. Only 10% of all respondents are of the opinion that soil protection laws (where applicable) are proving effective, whereas 50% consider them to be non-effective to a large extent. This may be due to the fact that soil protection laws primarily deal with qualitative soil protection concerns, whereas the quantitative aspect only plays a role in exceptional cases.

Awareness-raising efforts regarding the issue of soil loss as well as lobbying activities in favour of quantitative soil conservation must be increased Alps-wide. Best practice examples should generally be promoted, ideally supported by charismatic personalities (e.g. local politicians with long-term thinking). In particular, the economic consequences of soil losses as well as the ecosystem services of soils have to be made transparent and communicated actively in order to prompt action in the area of local land-use planning.

The definition of “good soil” needs to be standardised on an Alps-wide level (soil functions, soil life, scarcity, recoverability). On that basis, harmonisation of land take should be carried out in terms of Alps-wide monitoring and based on uniform criteria. Consumption figures with qualitative aspects need to be compiled (soil quality rating). Communication between national authorities has to be improved via the newly implemented spatial planning platform established in the context of the Alpine Convention. For subsidiary departments, clear procedural instructions designed to reduce land take must be drawn up. The coordinating and leading role of regional planning has to be revived and/or development planning and building competence shifted to a supra-communal level (cf. further information under chapter 4.1.4 and 4.2.4 in the detailed report).

Further measures concern agricultural development (e.g. a long-term cultivation obligation) or strategic environmental assessment (enhancement by adding soil-related objectives based on the model of the Land of Salzburg). Generally speaking, a significant price increase for land take has to be sought, inter alia by introducing land certificates based on the model of emissions trading.

Development of a regular exchange and knowledge transfer between soil conservation experts of the regions and countries

The study reveals that actors within the Alpine space often lack knowledge with regard to relevant soil conservation experts (“Who does what?”), soil conservation activities and projects. This also applies to possible soil conservation problems or good practices of other regions and countries. In order to implement the SCP Alps-wide and to overcome the challenges concerning soil conservation, an increased knowledge transfer and the inclusion of local actors (e.g. municipalities, mayors), particularly on an Alps-wide level, is a solution-based approach, since these actors play an important role in the implementation of the SCP. A number of networks that

deal with the topic of soil conservation already exist. These networks should be supported in pursuit of making their soil-related activities visible and in development of an Alps-wide network. A technical, topical and incident-related information exchange including experts of all levels (authorities, universities, project applicants, planning offices, interested laypersons) has to be enabled in a non-bureaucratic manner, as has been done in the course of the present project. Not just the bodies and actors of the Alpine Convention are suitable for this purpose, but so too are exchange activities in the course of projects (such as INTERREG VB or INTERREG VA).

All contracting parties to the Alpine Convention are actively encouraged to carry out such communication activities, as well as to undertake active information exchange with existing organisations (e.g. ELSA, Global Soil Partnership, Soil Science Associations, EU-wide and Alpine (research)projects).

In the framework of the macro-regional strategy for the Alps (EUSALP), Action Group (AG) 6, which is the most recently launched AG, is responsible for the following goal: “To preserve and valorise natural resources, including water and cultural resources”. AG6 coordinates the current efforts between the different regions regarding soil conservation in the Alps within the framework of EUSALP. The Region of Carinthia and the Permanent Secretariat of the Alpine Convention lead AG6, so that a direct link between EUSALP and the Alpine Convention is provided.

1 Introduction – Why a status review of the Alpine Convention’s Soil Conservation Protocol?

One of the tasks addressed by Germany during its Presidency of the Alpine Convention was to conduct a review of the implementation status of the Soil Conservation Protocol. In many countries, soil conservation is a requirement “neglected” by public administration and by society, as it cuts across so many fields of legislation. In the Alps, however, soil conservation is of particular significance, as soil is a finite and endangered resource and is under pressure from a multitude of uses. So it is important to consider qualitative aspects of soil conservation, such as maintaining soil functions and protecting special soil types, in addition to limiting large-scale land take in all the Alpine states¹ (= quantitative soil protection).

The Soil Conservation Protocol acts as an overarching legal instrument, with significant differences in its implementation at the European and the national levels.

The first step, in reviewing the Soil Conservation Protocol, was therefore to conduct an analysis to identify the fields of legislation and legal instruments of relevance to its implementation. This involved a literature review and an expert survey based on a detailed questionnaire. The full results of the survey were presented in a working paper in preparation for the Alpine Soil Symposium and were then discussed in more detail at the Symposium itself. It became apparent that there are still major gaps in the Protocol’s implementation, particularly in relation to joint monitoring and the sharing of soil data. There are also gaps in the exchange of information on aspects of soil conservation and on the interpretation of specific articles of the Protocol.

The present study offers qualitative insights into the difficulties affecting implementation of the Soil Conservation Protocol and identifies future needs and areas of action in the signatory states. It provides a general overview of relevant topics as a preliminary to other potential projects in the Alpine region and identifies prospective stakeholders. It can thus be regarded as a general status report on the Protocol’s implementation to date.

Infobox: The Alpine Convention and the Soil Conservation Protocol

The Alpine Convention, an international treaty for the protection of the Alps, entered into force in 1995. At the core of the implementation of this Convention are the eight Protocols. In addition to promoting a comprehensive policy for the protection of the Alps, the Convention supports sustainable development in the Alpine region.

The Soil Conservation Protocol (“the Protocol”) aims, among other things, to reduce quantitative and qualitative soil impairments, in particular by applying production processes which have a minimal detrimental impact on the soil, by using land economically, controlling erosion and restricting soil sealing. Bearing in mind the interests of resident populations, the Protocol aims to reconcile economic interests with ecological requirements. Given that the Alps constitute one of the largest continuous natural areas in Europe and are characterised by great ecological diversity and by highly sensitive ecosystems and that soil formation and regeneration of impaired soils happen very slowly, a further objective is to minimise the input of harmful substances and

¹ For statistics on the rate of land take in Bavaria, estimated at 11 ha/day, see LfU (2014): http://www.lfu.bayern.de/umweltqualitaet/umweltbewertung/ressourcen_effizienz/flaechenverbrauch/index.htm
The estimated figure for Austria is 19 ha/day: Ökosoziales Forum (2014): http://www.oekosozial.at/uploads/tx_osfopage/Factsheet_Boden_01.pdf

safeguard the functionality of Alpine soils. The Soil Conservation Protocol therefore seeks solutions to similar soil protection challenges for all Alpine states, and fosters the adoption of corresponding measures.

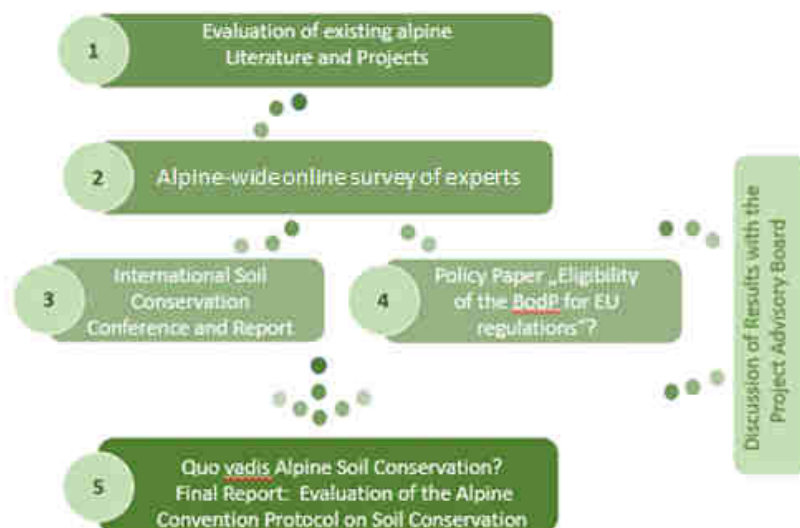
Further information about the Alpine Convention, the Soil Conservation Protocol and the other protocols is available here: [Alpine Convention](#)

In the context of the International Year of Soils 2015, the German Presidency of the Alpine Convention (2015-2016) supported a review of the Soil Conservation Protocol. The project, entitled “Assessment of the Soil Conservation Protocol with regard to its implementation and effectiveness in the Alpine region”, also involved the organisation of an international symposium. The project was funded by the German Federal Environment Agency (UBA) within the framework of the Environmental Research Plan (UFOPLAN). This paper is the final report for the UFOPLAN project, which was implemented by a consortium comprising blue! advancing european projects GbR (Munich, Germany), LAND-PLAN Büro für landschaftsökologische Planung und Gutachten (Ebersberg, near Munich, Germany) CIPRA Austria – Alpine Convention Office (Innsbruck, Austria), arp - alpen.raum.planung (Salzburg, Austria) and the University of Innsbruck – Institute of Public Law and Political and Administrative Sciences (Innsbruck, Austria).

2 Methodology

The status review of the Soil Conservation Protocol consisted of various elements, shown in the Figure below.

Figure 1 Diagram Methodological Approach



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Deutsch	English
Alpenweite Auswertung vorhandener Literatur und Projekte	Alps-wide review of existing literature and projects
Alpenweite Online-Expertenbefragung	Alps-wide online expert survey
Internationale Bodenschutzfachtagung und Tagungsbericht	Alpine Soil Symposium and Conference Report
Policy Paper „Eignung des BodP für Regelungen der EU“	Policy paper: Assessment of the Soil Conservation Protocol's suitability as a role model for European legislation
Quo vadis Bodenschutz in den Alpen? Abschlussbericht: Bilanzierung des Protokolls Bodenschutz der Alpenkonvention	Quo vadis soil protection in the Alps? Assessment of the Alpine Convention's Soil Conservation Protocol – Final Report
Diskussion der Ergebnisse mit dem Projektbeirat	Discussion of outcomes with project advisory board
Eigene Darstellung, 2016	Authors' own graphics, 2016

2.1 Alps-wide literature review

The review of the existing literature and soil conservation legislation in the various Alpine countries was the key basis for the development of the online questionnaire and the Symposium concept (see References – Further reading and information). It focused mainly on aspects requiring or offering positive scope for further soil conservation action in the individual countries. There was not enough time, within the study framework, to conduct a full review of all the extant literature on soil, however. In addition to examining relevant legislation, the review referred to recent technical symposia on soil conservation issues and focused equally on qualitative and quantitative aspects. For example, in early October 2015, the Flächenspar-Forum (Land Conservation Forum) in Bad

Reichenhall was co-organised as a transboundary project by the *Bavarian State Ministry of the Environment* and Consumer Protection and Austria's Environment Agency (Umweltbundesamt) for the first time. The event showcased a range of interesting practical examples of quantitative soil conservation from the two countries, which were useful reference points for the development of the online questionnaire and discussions at the Symposium.

Within the Alpine Convention framework, the Compliance Committee has launched a survey of Contracting Parties, focusing on space-saving soil use. The evaluation of the information on quantitative soil conservation provided by the Parties will be published by the Compliance Committee at the end of the process (and will in most cases be available from the National Focal Points of the Alpine Convention).

2.2 Alps-wide online expert survey

As a key element of the status review of the Soil Conservation Protocol, an Alps-wide online expert survey was designed and conducted. The purpose of this online survey was to obtain expert feedback from public administration, researchers, NGOs and private-sector soil conservation stakeholders in order to assess progress in implementing the Soil Conservation Protocol and the effectiveness of the actions taken in this context. A further aim of the survey was to identify Alps-wide soil conservation challenges and to develop recommendations on collective action to improve soil conservation in the Alps in future.

The expert survey provided detailed information on the following:

- ▶ specific fields of legislation and national/regional soil conservation strategies, in order to determine whether the regulations in place to protect soils and implement the Protocol are adequate,
- ▶ practical measures/actions to support implementation of the Soil Conservation Protocol (e.g. Flächenspar-Forum (Land Conservation Forum),
- ▶ the practicability of the measures/actions (Which ones have proved their worth? Where is there a need for improvement?), and
- ▶ current topics and measures to be addressed on a transboundary and/or transnational basis in the Alpine region in future, in order to increase the Protocol's effectiveness and the scope for its implementation.

Due to the diversity of themes covered by the Protocol and the wide range of sectors and stakeholders concerned with soil issues, a number of core Protocol-related topics were selected and explored in more detail in the online survey:

- ▶ risk assessment/erosion
- ▶ qualitative soil conservation and soil functions
- ▶ mountain farming, forestry, wetlands, moors
- ▶ quantitative soil conservation/land take
- ▶ international/Alps-wide cooperation.

At the start of the project, the consortium selected the interviewees for the qualitative online survey. Based on their spheres of interest and networks, 220 experts from soil conservation and other relevant sectors, e.g. regional planning, forestry and water resources management in the Alpine countries (AT, CH, DE, FR, IT, LI, MCO, SI), were identified as interviewees and contacted by letter within the survey framework. National, regional and local soil conservation stakeholders (cross-sectoral), representatives of the Alpine Convention, the European Commission (DG ENV),

research bodies (universities and other institutions), NGOs, the private sector and members of the project advisory board were eligible for nomination as interviewees.

In total, 82 people (37% of the experts contacted) from six Alpine Convention countries (AT, CH, DE, FR, IT and SI) participated in the survey. Detailed results of the survey are available in Annex 1. The results were presented and discussed at the Alpine Soil Symposium and were deliberated by the project advisory board.

2.3 Organising the Alpine Soil Symposium

The general topics to be addressed at the Symposium were identified with reference to the findings of the literature review and online survey and were discussed with the project advisory board before being finalised. The purpose of the international Symposium was to gather from practitioners in public authorities and researchers as much detailed information as possible about gaps in implementation and options for action on national or regional soil conservation policy. The Symposium also aimed to identify and discuss Alps-wide requirements and the implementation status of the Soil Conservation Protocol, showcase examples of best practice, highlight soil conservation problems and offer recommendations on future joint action to improve soil conservation in the Alps.

The Alpine Soil Symposium, which took place in Bad Reichenhall (DE) on 23-24 June 2016, attracted around 50 participants. The discussions focused on the following questions:

- ▶ How effective is the Soil Conservation Protocol?
- ▶ What are the current and future requirements in terms of Alpine soil conservation?
- ▶ Which examples of best practice/practical challenges exist in relation to the Protocol's implementation, particularly as regards quantitative and qualitative soil conservation, Alps-wide cooperation, knowledge sharing, and integration into planning processes?

In order to facilitate participants' discussions of the findings of the online survey on the Protocol's implementation status and to gather empirical data, four World-Cafés were organised on the following topics: quantitative soil protection; qualitative soil protection; international/Alps-wide cooperation; and knowledge transfer/integration into planning processes. The programme included technical presentations by representatives of the Permanent Secretariat of the Alpine Convention and the European Commission's DG Joint Research Centre (JRC), Ispra, Italy – Land Resources Management, and practical examples, such as the (non-)application of the Soil Conservation Protocol by the *Land of Styria*.

In thematic terms, the Symposium also built on the outcomes of the 2015 Workshop: "The Soil Conservation Protocol of the Alpine Convention – Significance and Application", hosted by CIPRA Austria and the Legal Services Bureau for the Alpine Convention.

A summary of the outcomes in German and English is available in the [Alpine Soil Symposium – Conference Report](#).

2.4 Discussion of outcomes with the project advisory board

A project advisory board, comprising representatives of various public authorities in the Alpine countries, was established to support the project and facilitate discussion and sharing of its outcomes. It consisted of representatives of the consortium, the German Federal Environment Agency (UBA), the *Bavarian State Ministry of the Environment and Consumer Protection (STMUV)*, the Swiss Federal Office for the Environment (FOEN), the *Land of Salzburg*, the government of the *Land of Upper Austria*, the *Land of Lower Austria*, the Slovenian Ministry of the *Environment* and

Spatial *Planning* and the German Alpine Club. The Permanent Secretariat of the Alpine Convention (PSAC) and the European Land and Soil Alliance (ELSA) each sent one representative. The involvement of these two organisations ensures appropriate professional evaluation of the work at Alps-wide and European level and guarantees long-term implementation and embedding of project outcomes via the Permanent Secretariat's provision of information to Contracting Parties and ELSA's extensive network of member Alpine municipalities and regions.

2.5 Policy Paper: Draft assessment of the Soil Conservation Protocol's suitability as a role model for European legislation

The European Union is already actively engaged in the field of soil conservation (e.g. European Soil Portal; Soil Thematic Strategy; various items of legislation on agriculture, waste and chemicals, pollution control, etc.). Even so, all the efforts to establish a single European legal framework for soil conservation have thus far failed. This contrasts starkly with the situation in international law, where a treaty with binding legal force has been adopted, namely the Alpine Convention's Soil Conservation Protocol, to which the European Union itself is a signatory.

The policy paper *The Soil Conservation Protocol of the Alpine Convention – A Role Model for European Legislation on Soil Protection?* (Annex 2) addresses the following question: does the evolution of the Soil Conservation Protocol offer any insights that may be useful for the development of European legislation in this field?

As is currently the case in the European Union, national legislators took years of lead-in time to adopt soil conservation legislation. This is due to the scope and complexity of the subject matter, the traditional fragmentation of powers and responsibilities in this area, the relative significance of land and soil to owners and nation-states alike, but also the lack of public awareness of soil conservation issues.

The fact that the Alpine Convention's Contracting Parties were successful in reaching agreement on the Protocol, despite these inauspicious circumstances, is primarily due to the fact that when it comes to soil conservation issues, the Alpine region is comparatively homogeneous, meaning that all the Parties are confronted with similar soil-related problems. Furthermore, when the Soil Conservation Protocol was adopted in 1998, soil protection was a highly topical environmental issue. As an additional factor in its favour, the Protocol was regarded from the outset as a political rather than a legal instrument: the obligations deriving from it were perceived to be minimal, with its more controversial provisions being deleted during the course of its negotiation.

In sum, the Soil Conservation Protocol is a successful compromise, albeit one which was achieved at a cost, namely watered-down content and reduced legal force.

3 Recommendations for further steps in Alps-wide soil conservation policy

This chapter summarises the key outcomes and presents them in the form of recommendations on possible further steps towards an Alps-wide soil conservation policy. Rather than focusing on harmonisation of legislation, which would exceed *the scope* of the study, its main purpose is to describe possible ways of progressing the implementation of soil protection in the Alpine countries within the existing legal framework. The statements are presented as a working hypothesis that is assumed to apply to France and Italy as well, although these two countries had very little direct input due to their low response in the expert survey.

The timing appears to be right for further coordination of soil conservation following the establishment, within the framework of the macro-regional strategy for the Alps² (EUSALP), of Action Group (AG) 6, which is responsible for the following goal: “To preserve and valorise natural resources, including water and cultural resources”, and the Sub-Action Group on Spatial Development and Soil Conservation as a forum for cooperation on soil conservation issues among the various regions within the broader EUSALP framework. The state (*Land*) of Carinthia and the Permanent Secretariat of the Alpine Convention have taken over the lead of AG6, so that a direct link between EUSALP and the Alpine Convention is established. Thematically, AG6 relates to specific objective 6c.1: “Sustainably valorise Alpine Space cultural and natural heritage” within Priority Axis 3: “Liveable Alpine Space” of the Alpine Space Programme³. This framework for a broader approach to soil conservation issues within EUSALP will benefit the further implementation of all the recommendations listed below.

3.1 Soil monitoring

Recommendation 1: Development of a shared approach to monitoring and soil data gathering in the Alpine Space

According to the participating experts, Articles 20 and 21 of the Soil Conservation Protocol have yet to be properly implemented. These two articles relate to comparable systems for data gathering and the coordination of monitoring.

There was general agreement, at the Symposium, that there is a lack of soil data based on uniform criteria for the Alpine region, making cooperation in some thematic areas more challenging. It is important, therefore, to give collective thought to the key data (type and scope of data, methods) that should be collected. This conclusion was drawn after a discussion about the objectives of a shared monitoring approach for the Alpine Convention and the specific aspects of soil conservation that it should address. As one outcome, it was agreed that a strategy for the progressive introduction of a shared monitoring approach should be produced. It was also agreed that Alps-wide monitoring of soil consumption should be based on uniform criteria, including, in particular, backing up consumption data with qualitative aspects (soil quality rating). It is important to ascertain which indicators/data layers can be incorporated from EU land monitoring at an appropriate data level. To support implementation, easy-to-use soil function maps to cover the entire Alpine region, modelled on those available in Upper Austria or Salzburg, for example, should be produced for planning purposes, based on a pragmatic approach.

² cf. EUSALP – EU Strategy for the Alpine Region, published 2016: <http://www.alpine-region.eu/>

³ Alpine Space Programme: Cooperation Programme 2014-2020, published December 2014: <http://www.alpine-space.eu/>

3.2 Alps-wide and global soil conservation

Recommendation 2: Integration and reconciliation of Alps-wide soil conservation with global goals

With the adoption of the 2030 Agenda for Sustainable Development and its 17 Sustainable Development Goals (SDGs)⁴, soil conservation is now recognised as a cross-cutting priority which must be mainstreamed in sustainable development processes (cf. Figure 2). Protecting soil is a key dimension of global action to combat poverty, hunger, climate change and species extinction. With SDG 15, the international community has now made a direct and binding commitment to the goal of soil conservation for the first time:

“Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.”

Figure 2: The 17 Sustainable Development Goals of the 2030 Agenda



© United Nations (2015): available at: <https://www.un.org/sustainabledevelopment/sustainable-development-goals/>

Target 15.3 is of particular relevance, stating that the international community should strive to achieve “a land degradation-neutral world” by 2030. This applies mainly to agricultural soils, but is also generally relevant to soils affected by erosion, particularly in combination with the impacts of global climate change, permafrost soils being one example. The Alpine countries are among the most developed in the world. In relation to soil conservation in the Alps, the Sustainable Development Goals (SDGs) therefore create an ethical obligation in terms of contributing actively to their realisation and continuous evolution and taking a lead role for other mountain regions to follow. The recommendation therefore is that every Alpine country should adopt soil conservation legislation at the national level (modelled, for example, on Germany’s), with equal regard for quantitative and qualitative aspects. Furthermore, the Alpine Convention’s soil conservation goals

⁴ The 2030 Agenda for Sustainable Development/Sustainable Development Goals (SDGs) adopted by the United Nations (UN)

https://www.bmz.de/en/ministry/principles/2030_agenda/index.html

must focus primarily on specific Alpine conditions, e.g. the very limited space for permanent settlement, the special role of soil in protecting against natural disasters, and appropriation of sensitive soils at high altitude. On all these points, efforts should be made to adopt more stringent conservation and implementation targets than those currently in place.

Other global environmental commitments besides the SDGs are also of relevance, such as the climate objectives agreed at UNFCCC COP21 in Paris⁵. Such commitments provide a framework for a proactive Alps-wide soil conservation policy that must be implemented systematically at both the national and the regional level. They include

- ▶ the Ramsar Convention on Wetlands (link to Article 9 of the Protocol),
- ▶ the EU Biodiversity Strategy (Target 2: Maintain and restore ecosystems and their services),
- ▶ the EU Green Infrastructure Strategy⁶, which focuses on ecological connectivity and protecting against erosion caused by intensive farming or extreme weather conditions,
- ▶ the new EU Forest Strategy⁷, which requires member states to maintain and enhance forest cover to ensure soil protection, water quality and quantity regulation.

The European Commission's DG Environment has launched various initiatives to build knowledge about soil conservation⁸. For example, one of its current projects, entitled "Updated Inventory and Assessment of Soil Protection Policy Instruments in EU Member States", aims to take stock of existing soil protection policies and measures at the EU level, identify key gaps in soil protection and support decision-making on further action. The project report is due to be published in early 2017⁹. Here, direct networking for the Alpine region would be beneficial in order to guarantee the transfer of knowledge on soil conservation issues and policy instruments.

3.3 Networking and exchange between soil conservation experts in the Alpine region

Recommendation 3: Development of a frequent and regular exchange between soil conservation experts in the Alpine region

The first step in better utilising the legally available options for soil conservation, based on the application of the Soil Conservation Protocol, is to substantially improve information exchange among stakeholders in the Alpine regions and countries, whether or not shared data formats exist. The debate about best practices among experts in the individual regions adds significant value in terms of knowledge and awareness of soil conservation issues and creates synergies which can be integrated into work at the local level.

This exchange should be systematically expanded and strengthened by multipliers in the individual countries and by public administrations and thus integrated into Alps-wide governance practice. One option is to include individual Contracting Parties' exchange initiatives in the two-year roadmaps that form part of the Alpine Convention's Multiannual Work Programme (MAP)

⁵ United Nations climate objectives (Paris Agreement):

http://unfccc.int/files/meetings/paris_nov_2015/application/pdf/paris_agreement_english_.pdf

⁶ Green Infrastructure:

http://ec.europa.eu/environment/nature/ecosystems/docs/green_infrastructures/GI%20webpage%20glossary.pdf

⁷ 2013: EU Forest Strategy : http://eur-lex.europa.eu/resource.html?uri=cellar:2c1c71af-8384-11e3-9b7d-01aa75ed71a1.0013.02/DOC_2&format=PDF

⁸ European Commission, DG Environment (2016): http://ec.europa.eu/environment/soil/index_en.htm

⁹ Further project information is available here: <http://ecologic.eu/13090>

2017-2022. It would also be useful to organise an annual meeting of soil conservation experts from all the Alpine countries; a possible format is a workshop with a moderated exchange of experience (similar to the workshop in Bad Reichenhall in June 2016 or the Soil Forum in Austria). Each Contracting Party is encouraged to make active contributions here.

3.4 Organisation of Alps-wide cooperation

Recommendation 4: Establishing an (informal) platform for improved Alps-wide cooperation

A regular platform for exchange among soil conservation experts – like the Soil Forum in Austria, for example – is needed at the Alps-wide level. At present, this exchange tends to be sporadic, primarily due to the substantial differences in the responsibilities of the various ministries at country level. The Convention's Contracting Parties could take a lead here and advocate for, and if appropriate initiate, interministerial cooperation. The medium-term goal should be to set up a working group to look seriously at the possibility of harmonising soil conservation in the Alps, with formal arrangements that are designed to keep the process as straightforward as possible. Intensive cooperation with EUSALP AG6 (unless the role of working group is assumed by AG6 itself) should be actively sought, along with dialogue and engagement with the European Commission. EUSALP AG6 currently offers the best prospect of ensuring that the Alpine regions represented within it are kept continuously informed and involved in relevant projects.

A further option is to establish an Alpine Soil Partnership within the framework of the FAO's Global Soil Partnership (GSP). GSP's mission is to improve global governance of limited soil resources in order to safeguard the availability of productive soils for food security worldwide, and also to preserve other essential ecosystem services which are important for water regulation and supply, climate regulation, biodiversity conservation and cultural services, etc. Tools include:

- ▶ facilitating/contributing to the exchange of knowledge and technologies among key stakeholder groups,
- ▶ facilitating/contributing to multilateral environmental agreements,
- ▶ promoting access to soil information and advocating for the need for new soil surveys and data collection,
- ▶ promoting institutional strengthening and capacity development of soil institutions at local, national, regional and interregional levels; and
- ▶ promoting public and governmental awareness of soil conservation issues, e.g. via World Soil Day (5 December).

3.5 Information and awareness-raising

Recommendation 5: Continuous information and awareness-raising at regional/municipal level

Soil conservation is a thematic area whose communication and implementation are primarily a matter for public administration. NGOs engaged in this area point out that soil issues are particularly significant at the lowest tier of government, i.e. the municipalities, which in most countries are responsible for practical land-use planning. Here, the challenge is to raise awareness of the generally limited availability of soil as a resource. The municipalities are the primary interlocutors in this context, particularly with regard to land take.

Other key target groups for communication on soil conservation issues, alongside the municipalities and mayors, are the water, agriculture and forestry sectors, which make a major contribution to preserving the protective functions of soil in the Alpine countries.

All the Contracting Parties to the Alpine Convention are actively encouraged to initiate and support appropriate communication measures, particularly at municipal and regional level, and actively seek dialogue with existing organisations (e.g. ELSA).

On a practical level, more effort should be invested in providing information and raising awareness of the concept of ecosystem services, meaning the functions and benefits that soil provides for human communities in the Alpine region, in order to valorise soil and highlight its contributions. This should target practitioners and the public in equal measure.

Handbooks on regional/national implementation of the Soil Conservation Protocol in the Alpine Space are another valuable source of information. A good example is *Alpenkonvention in der örtlichen Raumplanung*, published by the Land of Styria¹⁰ (AT), which is a practical guide to the Soil Conservation Protocol's application in local spatial planning. This type of tool, tailored to each region/country, should be available throughout the Alpine Space.

In addition, information events on the Soil Conservation Protocol, targeted at practitioners, should be held at local/regional level and on a transboundary/Alps-wide basis to showcase examples of best practice in Alpine soil conservation¹¹.

3.6 Lessons learned from the Soil Conservation Protocol: a model for European legislation?

Recommendation 6: Less is more – European soil conservation should confine itself to key principles to avoid falling victim to the complexity of the subject matter

The evolution and structure of the Soil Conservation Protocol allow very few conclusions of relevance to the development of soil conservation legislation at the European level to be drawn, for the following reasons:

First, it is important to recognise that the Soil Conservation Protocol is limited in its effectiveness. Few of its articles include clear instructions for action, and a robust compliance mechanism is lacking. This inevitably limits the Protocol's suitability as a model for binding legislation at the EU level.

Furthermore, there is great diversity in soil conservation issues across Europe, making it difficult to identify a common denominator.

In contrast to international law, where there is an acknowledged gap in enforcement due to weak or non-existent sanctions for non-compliance, EU law is backed by the jurisprudence of the European Court of Justice and is therefore highly effective. For the Contracting Parties to the Alpine Convention, therefore, reaching agreement on the Soil Conservation Protocol was a low-risk undertaking as it was regarded primarily as a political instrument, whereas the development of soil conservation legislation at EU level is viewed more critically due to the legal obligations that this entails.

One factor in the Soil Conservation Protocol's success is its lack of complexity. Indeed, this may be its most important feature in terms of its suitability as a model for soil conservation legislation at

¹⁰ Amt der Steiermärkischen Landesregierung (2012): Leitfaden Alpenkonvention in der örtlichen Raumplanung: <http://www.raumplanung.steiermark.at/cms/ziel/61637891/DE/>

¹¹ See the Alpine Soil Symposium within the current project framework or the Workshop organised by the Legal Services Bureau for the Alpine Convention (CIPRA AT): <http://www.cipra.org/de/news/das-bodenschutzprotokoll-der-alpenkonvention-bedeutung-und-anwendung>

the European level. The aim should not be to establish a comprehensive protection regime but to define key principles as the basis and parameters for the enactment of implementing laws on soil conservation by the member states. Provisions prohibiting any worsening of status, similar to those set forth in Natura 2000 and EU water legislation, point the way forward here. Based on this approach, the European Union – as is its function – can set the broad legal framework for soil conservation without become mired in regulatory minutiae.

4 Summary of the key findings of the expert survey and Symposium

This chapter summarises and explains the findings of the online survey on the core Protocol-related topics, listed below. Detailed information on the individual issues can be found in Annex 1 of this report. Section 4.1 looks at positive aspects of the Protocol's implementation, while Section 4.2 examines items which have not yet been actioned; proposed solutions are then discussed in Section 4.3. The topics are dealt with in the following order:

- ▶ risk assessment/erosion
- ▶ qualitative soil conservation and soil functions
- ▶ mountain farming, forestry, wetlands, moors
- ▶ quantitative soil conservation/land take
- ▶ international/Alps-wide cooperation.

4.1 Positive aspects of the Protocol's implementation

The following positive aspects of the Protocol's implementation were identified from the analysis of the online survey, details of which can be found in Annex 1, and the outcomes of the World-Cafés at the Alpine Soil Symposium. The positive aspects are summarised in the subsections and explained in more detail with reference, as far as possible, to the relevant article of the Soil Conservation Protocol.

4.1.1 Risk assessment/erosion

The thematic area of risk assessment was examined with reference to erosion. Other aspects of risk prevention, such as soil compaction, although implicitly included, were not addressed separately in the questions.

Controlling erosion is one of four key measures mentioned right at the start of the Soil Conservation Protocol, i.e. in the **Preamble. Article 1 (3) of the Protocol** states that measures are to be taken for the avoidance of erosion. Erosion is a particular focus of attention in **Article 11**, which concerns the “designation and management of Alpine areas threatened by erosion”. These aspects are first summarised below and then discussed in terms of the relevant article of the Protocol.

60% of respondents (49 persons) answered the questions on risk assessment/erosion.

Respondents mentioned a wide range of measures to limit soil erosion, the first and foremost being the provision of advice to land users and the inclusion of conditions in approval procedures. There are various examples of best practice pertaining to the use of erosion mapping in day-to-day work and the application of erosion control techniques with minimal environmental impact (**Article 11**). Diverse regional examples exist in the Free State of Bavaria, the Austrian states (*Länder*) of Tyrol, Vorarlberg, Salzburg and Styria, and in France and Slovenia.

There are also examples of management techniques based on sound practices which are adapted to suit local conditions (**Article 12**), and measures to use and maintain forests (**Article 13**) in such a way that soil erosion and harmful soil compaction are avoided. They vary in terms of their regional distribution; currently, most examples come from the states (*Länder*) of Salzburg and

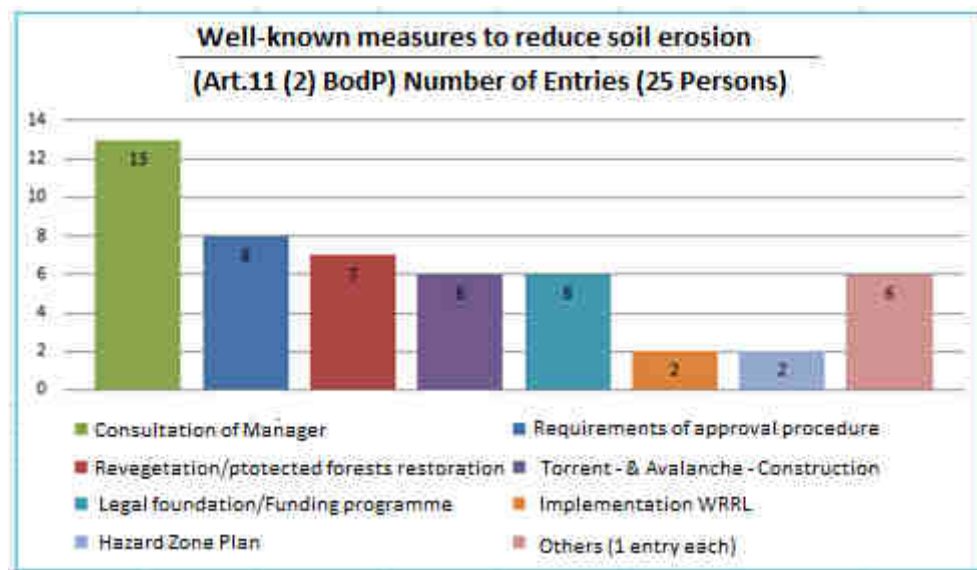
Upper Austria and from the Free State of Bavaria, but there are also examples from Vorarlberg, Tyrol, Lower Austria, Carinthia, France, South Tyrol and Slovenia.

In some regions of the Alpine Space, there are also examples of best practice in the use of methodological bases for soil erosion assessment (**Article 1 (3), Article 11**).

Article 11 – Designation and management of Alpine areas threatened by erosion

Deutsch	English
Bekannte Mittel zur (25 Personen)	Recognised methods to limit soil erosion (Article 11(2) of the Protocol): number of mentions (25 persons)
Beratung Bewirtschafter	Provision of advice to land users
Auflagen in Bewilligungsverfahren	Inclusion of conditions in approval procedures
Wiederbegrünung .. Schutzwaldsanierung	Regeneration / restoration of protective forests
Wildbach- und Lawinenverbauung	Mountain torrent and avalanche barriers
Gesetzliche Grundlagen / ...	Legal provisions / funding programmes
Umsetzung WRRL	Implementation of Water Framework Directive
Gefahrenzonenpläne	Plans for at-risk areas
Weitere ...	Other (one mention each)

Figure 3 Recognised methods to limit soil erosion (Article 11 (2) of the Protocol)



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The following were cited as examples of the day-to-day use of erosion mapping in accordance with **Article 11 (1)**:

1. Tyrol: Kaserstattalm/Stubaitalalm, slope in the back *Schmirntal* valley
2. Styria: Erzberg (Eisenerz Alps)
3. Bavaria: Riedberger Horn ski resorts (Oberallgäu rural district), arable farming areas in Bavaria
4. France: natural hazard preparedness plan (for all mountain regions in France)

5. Europe: EEA reporting (Copenhagen), Eurostat indicators: soil erosion (Europe)

The following were mentioned in particular as areas for the application of techniques with minimal environmental impact to protect human beings and material goods in measures to control water erosion and to reduce surface run-off (**Article 11 (3)**): water resources management, forestry and civil engineering, but also mountain torrent and avalanche barriers, land management projects and ski slopes.

Specific examples of the application of techniques with minimal environmental impact (**Article 11 (3)**) mentioned by respondents include restoration of mountain forests, restoration and management of protective forests and technical defences against rockslides throughout the Alpine Space, the natural hazard preparedness plan for mountain regions in France, and country-specific measures in Slovenia; regions mentioned include Obertauern in *Land Salzburg*, the Schesatobel area in Bärnbühl municipality in *Land Vorarlberg* and Erzberg in the Eisenerz Alps in Styria.

Article 12 – Agriculture, pasture farming and forestry

As examples of management techniques based on sound practices which are adapted to suit local conditions and thus ensure protection against erosion and harmful soil compaction (**Article 12 (1)**), agriculture, pasture farming and forestry were mentioned in particular, along with the preservation of moors as retention areas and grassland conservation.

Specific regions and examples of the use of these techniques (**Article 12 (1)**) include:

- ▶ Flachgau and Tennengau (*Land Salzburg*): Salzburg Regional Programme for Grassland Conservation,
- ▶ high-elevation sites in the back Schmirntal valley (*Land Tyrol*): extensive pasture farming with sheep,
- ▶ Krappfeld (*Land Carinthia*): an EU groundwater protection project,
- ▶ South Tyrol: development of mixed forest to stabilise forest stands,
- ▶ throughout the Alpine Space: restoration and management of protective forests,
- ▶ *Land Vorarlberg*: a traditional *plenter forest system* in the north of the state,
- ▶ *Land Salzburg*: regeneration of moors (Mandlinger Moor in Pongau; wet meadows at Hollersbach im Pinzgau) and conservation of moors (Lucia-Lacke in Pinzgau; southern shore of Lake Zell in Pinzgau) and
- ▶ the principle of “good professional practice”, communicated via guidelines in Slovenia.

Some respondents were of the opinion that the management techniques mentioned (**Article 12 (1)**) went further than is required under cross-compliance rules.

Some respondents saw a causal connection with the substance of **Article 12 (1)** in relation to management techniques based on sound practices which are adapted to suit local conditions. However, few details were provided (Austria, South Tyrol, Bavaria). Only the ban on the use of sewage sludge on agricultural soils (mountain pastures and Alpine grassland) in *Land Salzburg* was mentioned specifically.

Article 13 – Silvicultural and other measures

The following measures by which forests are used and maintained in such a way that soil erosion and harmful soil compaction are avoided (**Article 13 (2)**) were mentioned in particular: site-appropriate silviculture, site-appropriate tree species composition, natural forest regeneration, afforestation of at-risk sites, soil-conserving forest management, promotion of biodiversity in

forest habitats, management of game stocks in forest habitats, site-appropriate road construction and the preservation of heritage farming.

Some respondents saw a causal connection with the substance of **Article 13 (2)** in relation to forest use and management. By far the majority of arguments in favour of this connection came from Austria (forestry legislation, protection of residential areas, awareness-raising, promotion of an integrated vision). Vellacher Kotschna (high valley in the Steiner Alps, Carinthia) and the Herzogstand in Bavaria (Alpine foothills) were mentioned as examples.

Article 1 (3) – Objectives – Measures to be taken, and Article 11

The following were mentioned in particular as methodological bases for *soil erosion sensitivity assessment* in accordance with **Article 1 (3)** and **Article 11**: hazard maps, land registry records, training, flyers, work aids and appraisal modules (e.g. as a Web GIS application), soil science data and soil maps.

The following were identified as specific regions and examples of the availability of methodological bases for *soil erosion sensitivity assessment* in accordance with **Article 1 (3)** and **Article 11**:

1. Austria: Nationwide soil erosion assessment is undertaken within the Austrian Digital Soil Map (eBOD) framework; the *Federal Agency* for Water Management also provides methodological bases on erosion sensitivity.
2. *Land* Vorarlberg: Within the framework of recharge.green, an EU-funded project which is part of the Alpine Space Programme, assessments of the Leiblachtal valley were conducted and incorporated into the region's energy plan.
3. Free State of Bavaria: The erosion risk registry set up by the Bavarian State Ministry of Food, Agriculture and Forestry is the basis for erosion control in the context of mandatory cross-compliance (Bavarian Erosion Control Ordinance – *Erosionsschutzverordnung* (ESchV) 2015) and for planning in lake basins.
4. Baden-Württemberg: methodological bases are available for all loess catchments.
5. Italy: methodological bases are available for the Aosta Valley.

4.1.2 Qualitative soil conservation, soil functions

As an ecosystem, soil provides a variety of services, e.g. habitat for soil organisms, a medium for growth of natural plant communities, water flow regulation, natural soil fertility, filtering and buffering of contaminants, groundwater recharge, heat balancing, carbon storage.

The term “qualitative soil conservation” was limited to precautionary soil protection relating to soil functions. Aspects of qualitative soil conservation relating to soil contaminants (e.g. heavy metals, organic pollutants) were only considered by way of exception. The safeguarding and preservation of the natural functions of soil are expressly defined as an objective in **Article 1 (2) of the Protocol**.

Soil functions are most visible in relation to the hydrological balance (flood control, drinking water protection, heat balancing) and carbon storage (content of organic substance).

The questions on soil functions/qualitative soil conservation were answered by almost 90% of respondents (71 persons).

For the respondents, this was a highly relevant topic (**Article 1 (2)**); it was described as being ever-present and playing a role in respondents' day-to-day work. The filtering function was mentioned most often, with heat balancing and carbon storage mentioned least.

In many regions across the Alpine Space, targeted measures are already being taken to preserve natural/ecological soil functions in a sustainable manner in qualitative and quantitative terms (**Article 1 (2)** and **Article 1 (3)**). These measures are being taken primarily in the Austrian states (*Länder*) of Salzburg and Upper Austria and in the Free State of Bavaria, but also in Switzerland, Tyrol, Lower Austria and South Tyrol. Some respondents, particularly from *Land* Salzburg, saw a causal connection with **Article 1 (3) of the Protocol**.

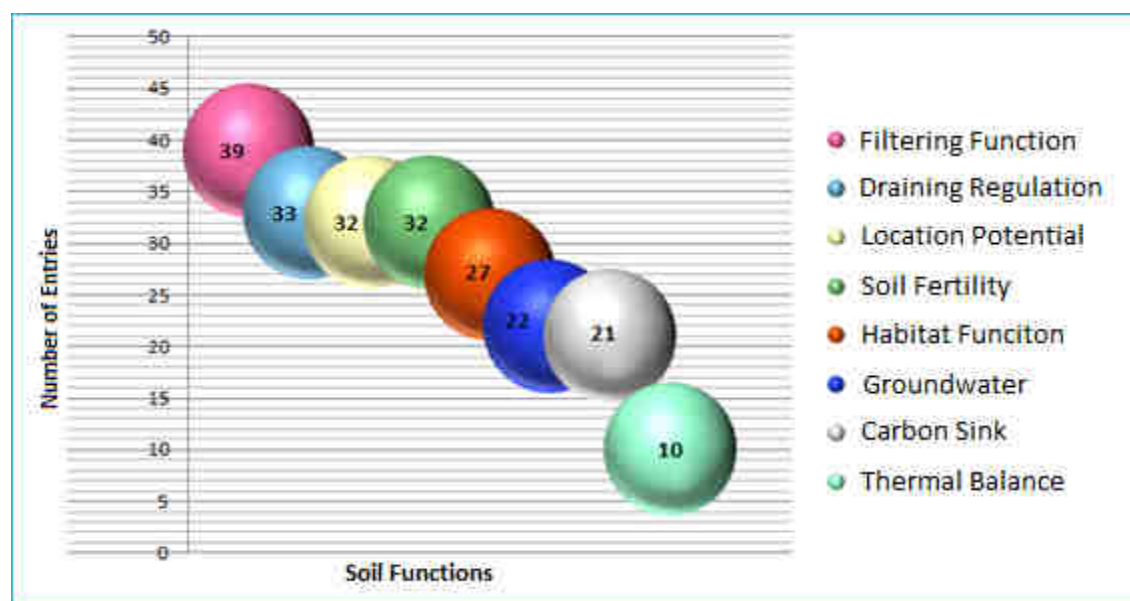
In some cases, the "preservation of natural soil functions" expressly mentioned as an objective in **Art. 1 (2)** is defined in other legislation as the specified aim of states' soil management planning. Various items of legislation from Switzerland, *Land* Salzburg, Upper Austria and Germany were mentioned in this context.

Various methodological bases for the appraisal and description of the various soil functions are already available in many regions across the Alpine space (**Preamble, Article 1 (3), Article 8 (2)**). Soil function maps, appraisal modules, work aids and training were mentioned in particular and are mainly available in *Land* Salzburg, Upper Austria, Bavaria and also in Switzerland. Currently, the states (*Länder*) of Upper Austria and Salzburg provide a soil function assessment in the form of a Web GIS application covering the whole area, while Bavaria offers a concept soil map which covers the whole area, as well as a soil function assessment for pilot sites.

Article 1 (2) – Objectives – Preservation of soil to allow it to perform its natural functions

The following soil functions of relevance to respondents' day-to-day work were mentioned (**Article 1 (2)**) (see Figure 4):

Figure 4: Soil functions that are considered as crucial element of the respondents' professional life (Art. 1 (2) BodP)



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Filterfunktion	Filtering function
Abflussregelierung	Water flow regulation
Standortpotenzial	Medium for plant growth
Bodenfruchtbarkeit	Soil fertility
Lebensraum	Habitat
Grundwasser	Groundwater recharge
Kohlenstoffsенke	Carbon storage
Thermischer Ausgleich	Heat balancing
Anzahl Nennungen	Number of mentions
Bodenfunktionen	Soil functions

Rather surprisingly, the filter function (filtering and buffering of contaminants and acids), a highly complex function, received the largest number of mentions. The science behind the following soil functions is easier to understand, even for the less experienced: water flow regulation (the soil's ability to retain and discharge water into rivers and streams after heavy rainfall), a medium for growth of plant communities of nature conservation value, and natural soil fertility. This is also reflected in the number of mentions. Other soil functions – “habitat for soil organisms” and “groundwater recharge” – are, at present, less relevant to day-to-day work. The “new” soil functions of carbon storage and heat balancing also received comparatively few mentions but are likely to gain in importance in future in the context of climate change.

Article 1 (3) – Objectives – Measures to be taken

In many regions across the Alpine Space, targeted measures are already being taken to preserve natural/ecological soil functions in a sustainable manner in qualitative and quantitative terms ([Article 1 \(2\)](#) and [Article 1 \(3\)](#)):

In *Land Salzburg*, soil function assessment is a mandatory element of planning. The soil function assessment is provided free of charge by the *Land* (this also applies in Upper Austria). It is taken into account in the planning process; soil conservation measures are defined as well. In addition, there are synergies with nature conservation legislation in *Land Salzburg*.

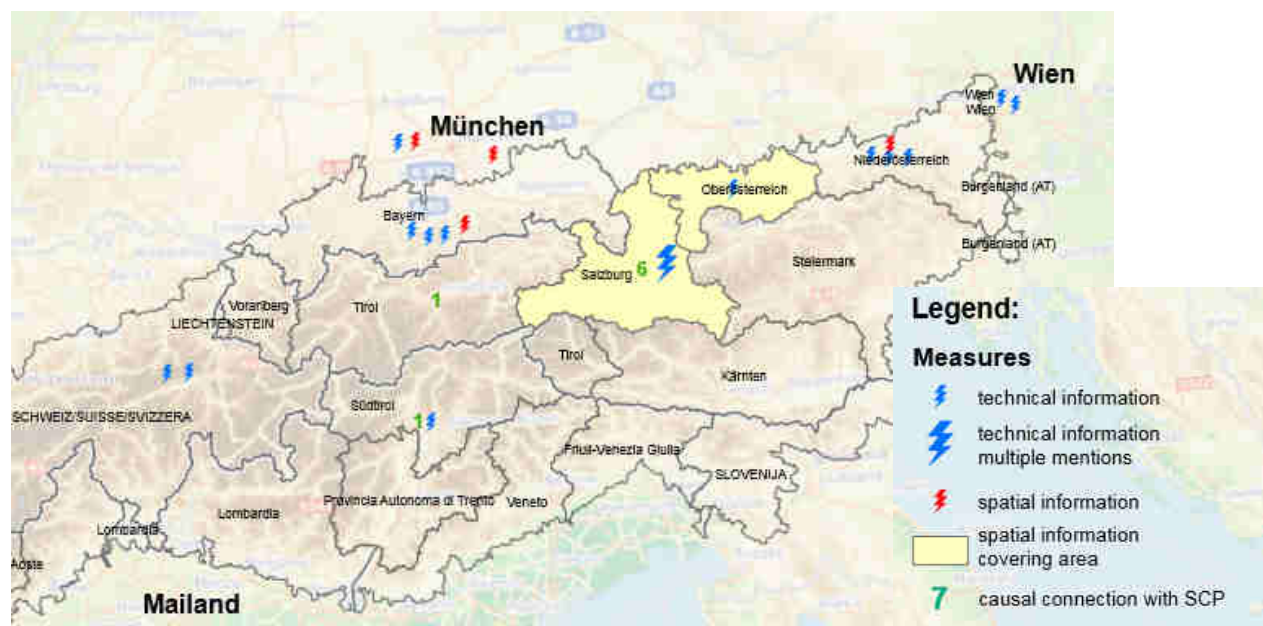
In Bavaria, natural soil functions are safeguarded by measures such as the cancellation of proposed development or road construction projects as a result of local referenda, and precautionary measures in drinking water protection areas, which cover 4 -5% of the *Land* area.

In Switzerland, consistent soil monitoring of construction schemes enables targeted action to be taken during building, thus protecting soil functions. The same applies to nature parks and national parks in Switzerland.

In South Tyrol, formerly contaminated sites have been rehabilitated and, in this way, ecological soil functions restored.

Based on the responses, an overview of the spatial distribution of targeted measures already being taken to preserve natural/ecological soil functions in a sustainable manner in qualitative and quantitative terms ([Article 1 \(2\)](#) and [Article 1 \(3\)](#)) is provided below (Figure 5):

Figure 5: Spatial distribution of definite measures to secure ecological soil functions (Art. 1 (2) und Art. 1(3) BodP)



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Eight respondents, six of them from *Land Salzburg*, saw a causal connection with **Article 1 (3) of the Protocol** here.

Article 1 (2) – Objectives – Preservation of soil to allow it to perform its natural functions / other legislation

Some respondents reported that in their country, the “preservation of natural soil functions” expressly referred to as an objective in **Art. 1 (2)** is defined in other legislation as the specified aim of states’ soil management planning. Various items of legislation were mentioned in this context:

1. Switzerland: Ordinance on the Pollution of Soil (VBBo) 1998; national soil strategy [in preparation]
2. *Land Salzburg*: Soil Protection Act (BodSchG) 2001, Spatial Planning Act (ROG) 2009, Nature Conservation Act (NSchG) 1999, Environmental Assessment Ordinance for Spatial Plans and Programmes (*Umweltprüfungsverordnung für Raumordnungspläne und –programme*) 2007
3. *Land Upper Austria*: Soil Protection Act (BodSchG) 2003, regional spatial planning programmes for Eferding and Linz-Umland 2
4. Germany; Federal Soil Protection Act (BBodSchG) 1998, Federal Building Code (BBauG) 1960 [Section 202: Protection of Topsoil], Federal Nature Conservation Act (BNatSchG) 1977

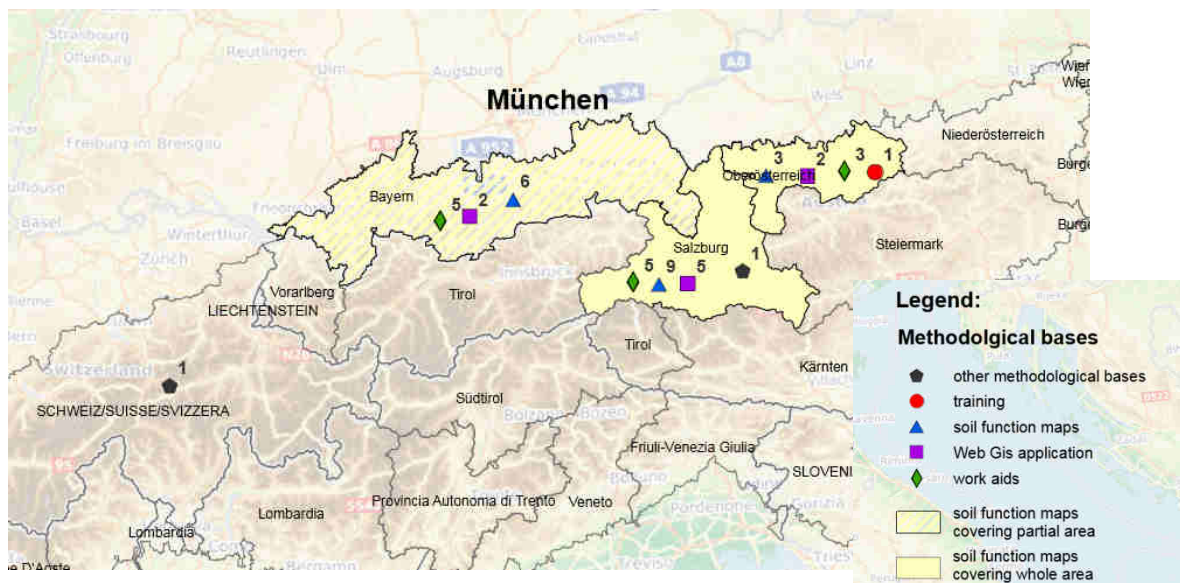
Preamble – Threats to the preservation of soil functions, Article 1 (3) – Objectives – Measures to be taken to preserve the soil in a manner which allows it to perform its natural functions, Article 8 (2) – Extraction of mineral resources

Various methodological bases for the appraisal and description of soil functions are already available in many regions across the Alpine Space (**Preamble, Article 1 (3), Article 8 (2)**). Soil

function maps, appraisal modules, e.g. as a Web GIS application, training, flyers, work aids, land registry records and basic soil mapping should be mentioned in particular. In relation to possible positive/negative impacts, the primary aim is to preserve, minimise impairment of and restore soil functions.

Based on the responses, an overview of the regions in which adequate methodological bases are available for the assessment of various soil functions is provided below (**Preamble, Article 1 (3), Article 8 (2)**) (see Figure 6):

Figure 6: Spatial distribution of present methodological basics to evaluate soil performances (Preamble BodP, Art. 1 (3) BodP, Art. 8 (2) BodP)



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This spatial distribution shows that the states (*Länder*) of Salzburg and Upper Austria make available a soil function assessment covering their entire area as a Web GIS application. Bavaria makes this available for parts of its area. These states also offer work aids; in addition, Upper Austria provides training. Additional methodological bases are available in *Land* Salzburg - in the form of biotope mapping – and Switzerland, where soil functionality can be determined locally through mapping as required.

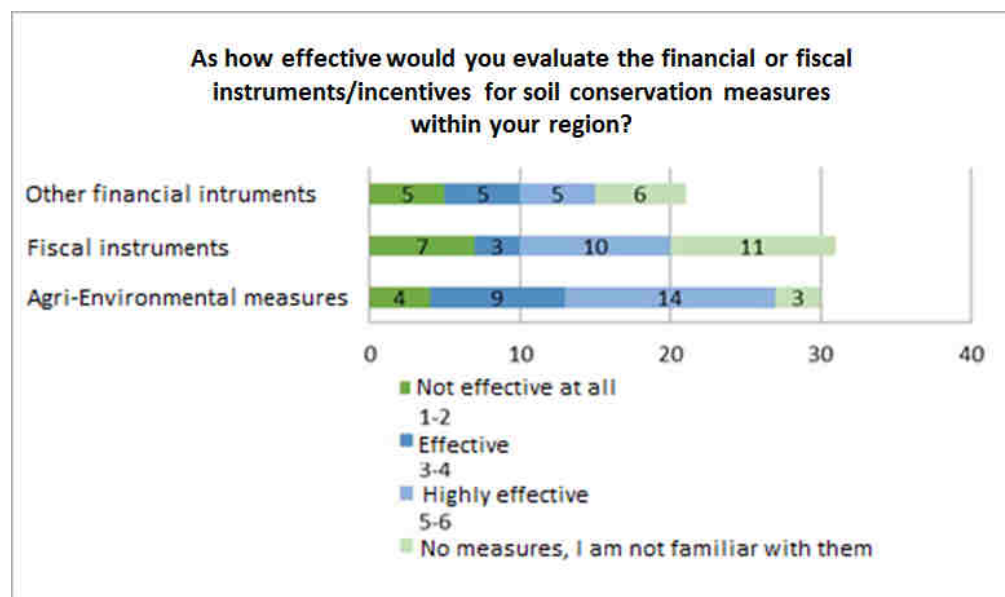
4.1.3 Mountain farming, forestry and wetlands/moors

The Soil Conservation Protocol includes several articles whose purpose is to preserve and promote mountain farming that has a minimal detrimental impact on the environment and is adapted to the specific Alpine conditions for agriculture and forestry (Article 12). This includes maintaining the long-term viability of settlements in remote rural areas and applying sustainable management practices (in Alpine pastures), with a particular emphasis on high-quality products that are typical of the locality. The natural environment is preserved through extensive use (with a particular emphasis on the conservation of wetlands and moors (Article 9)), minimising substance input (pesticides, fertilisers) as far as possible, preventing natural hazards and safeguarding the aesthetic value of the landscape and the recreational value of nature, landscape and cultural life. A further aim is to create a sense of solidarity and responsibility within local communities and municipalities. Silvicultural management techniques with minimal environmental impact (Article 13) should be applied in order to preserve mountain forests as a near-natural habitat and measures such as afforestation, forest expansion and improving stability

should be implemented to the necessary extent. This is achieved through prudent and sustainable use of mountain forests in harmony with nature.

The various user groups are encouraged to apply sustainable management practices in agriculture and forestry (**Article 2 (3)**) through a range of incentive schemes, including tax incentives and agri-environmental measures (ÖPUL, KULAP and ÖLN were mentioned most frequently), or cross-compliance requirements. Opinions of their effectiveness and impact vary from country to country but schemes such as these are generally viewed positively insofar as they relate to agricultural and forestry management in a practical sense (see Figure 7).

Figure 7: Effectiveness of financial or fiscal tools/incentives for soil conservation measures



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Deutsch	English
Wie wirksam schätzen Sie finanzielle oder fiskalische Werkzeuge/Anreize für Maßnahmen zum Bodenschutz in Ihrer Region ein?	How effective, in your view, are financial or fiscal tools/incentives for soil conservation measures in your region?
Sonstige finanzielle Werkzeuge	Other financial tools
Fiskalische Werkzeuge	Fiscal tools
Agrarumweltmaßnahme	Agri-environmental measure
Gar nicht wirksam	Not effective at all
Wirksam	Effective
Höchst wirksam	Highly effective
Keine Maßnahme, mir sind keine bekannt	I am not aware of any such measures

Further measures which are being implemented successfully and offer scope for expansion are governed by administrative law and include ringfencing of part of the local tourist tax for landscape management by farmers and the provision of targeted support for the conservation and improvement of protective forests.

The conservation of moors, wetlands and biotopes is covered by **Article 9 of the Protocol** and by relevant nature conservation legislation adopted at national and regional level (at the

international level, the Ramsar Convention applies; the relevant EU legislation is the Habitats Directive and its transposition into national law). In theory, this achieves complementary protection, primarily for aquatic habitats and but also for soil-related aspects (soil type).

In all aspects of soil conservation that have a bearing on farming, the broadly defined term “good professional practice” (GPP) or “good agricultural practice” (GAP) applies. It describes a system of management which utilises modern technology in conventional farming but also takes the environment into account. One definition is supplied by the Food and Agriculture Organization (FAO) in Rome: “... GAP applies available knowledge to addressing environmental, economic and social sustainability for on-farm production and post-production processes resulting in safe and healthy food and non-food agricultural products.”¹² The German Federal Soil Protection Act [Article 17(2) BBodSchG] provides a much more detailed definition, which starts as follows: “The principles of good practice in agricultural soil use are the permanent protection of the soil’s fertility and of the soil’s functional capacity as a natural resource.” The definition of good practice is a useful starting point for developing a shared understanding of soil conservation in agriculture and forestry.

4.1.4 Quantitative soil conservation

In Austria, a nationwide standard for spatial monitoring appears to have become established, namely the regional information held in the Real Estate Database (GDB) of the Federal Office of Metrology and Surveying (BEV). It provides soil-related information based on specific administrative units (e.g. state, district, municipality) and, among other things, categorises parcels of land according to their characteristics (e.g. built area, forest, water body) and type of use (e.g. built area that has been greened/paved). The regional information is updated as required to reflect changes in the GDB and the Digital Cadastral Map (DKM). As the system breaks down the territorial arrangements to granular (cadastral district) level, it offers scope to conduct specific evaluations within the Alpine Convention perimeters as well.

In Switzerland, the Federal Statistical Office’s well-established system of land-use statistics, which provides a high level of detail and accuracy, has been updated. The land-use statistics, whose periodicity is nine or 12 years, provides information about land cover and land use for every hectare of Switzerland using aerial images produced by the Federal Office of Topography (swisstopo). In addition to numerical data, the land-use statistics provide basis geodata for federal and university geographic information systems (GIS) and also generate inputs for national monitoring programmes (Monitoring Spatial Development Programme, Biodiversity Monitoring Switzerland, Hydrological Study Areas) and indicator systems.

The data are broken down to LAU level 2 (local administrative unit – municipalities), which in principle allows separate reporting for the Swiss perimeter of the Alpine Convention. Barrier-free access to the data is available via the Federal Statistical Office’s website¹³.

Information is collected on land use (46 categories) and land cover (27 categories).

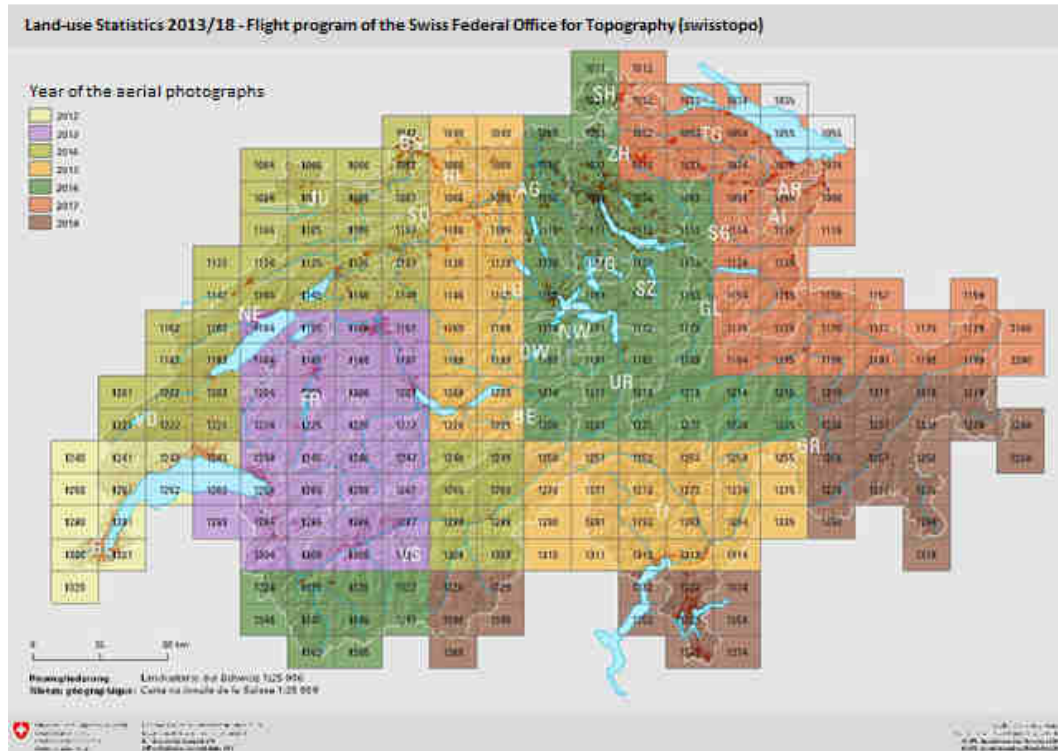
Currently (late 2015), the 2015-2018 update of the land-use statistics covers the territory of western Switzerland (four cantons, 632 municipalities; see Figure 8)¹⁴.

¹² FAO, Committee on Agriculture, Seventeenth Session, Rome, 31 March – 4 April 2003. Development of a Framework for Good Agricultural Practices

¹³ Swiss Confederation (Schweizerische Eidgenossenschaft 2016e):
<http://www.bfs.admin.ch/bfs/portal/de/index/infothek/online/bd/stattab.html>

¹⁴ Detailed data are available here: Swiss Confederation (Schweizerische Eidgenossenschaft 2016c):
<http://www.bfs.admin.ch/bfs/portal/de/index/themen/02/03/blank/data/gemeindedaten.html>

Figure 8: State of records of the revised Swiss land-use statistics (Art. 7 (1) BodP)



© Schweizer Eidgenossenschaft (2016a), available at:

http://www.bfs.admin.ch/bfs/portal/de/index/infothek/erhebungen_quellen/blank/blank/arealstatistik/00/00_01.parsys.0001.DownloadFile.tmp/flugplan201318.pdf

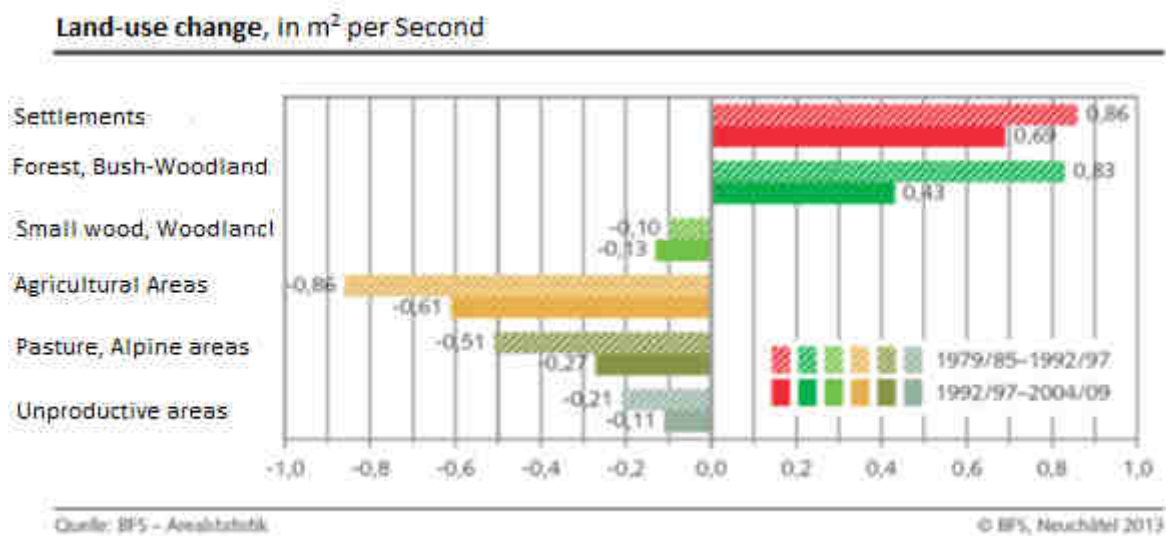
In Switzerland, the data currently available indicate that the rate of decline in cultivated land has slowed (see Figure 9). This ties in with a reference in the online survey to a paradigm shift which, it is claimed, has to do with the new Spatial Planning Act in Switzerland: here, tight restrictions on settlement growth are combined with clear prioritisation of brownfield development.

In Switzerland, as elsewhere, the amount of arable land suited to crop rotation fell below national self-sufficiency level many years ago. However, the measures adopted in response to this situation are having an impact. In 1992, the Sectoral Plan for Crop Rotation Areas (*Sachplan Fruchtfolgeflächen* – SP FFF) came into effect, requiring at least 438,460 ha of prime agricultural land to be preserved¹⁵. The conversion (zoning) of these areas is now permitted only in exceptional cases, which are precisely defined. The aim is to ensure that Switzerland has an adequate supply basis, as stipulated in Article 1, paragraph 2 of the Federal Act of 22 June 1979 on Spatial Planning (RPG). The Sectoral Plan is currently under review, with the strategic direction for an updated and more robust version of the Plan to be determined by the end of 2016¹⁶.

¹⁵ Swiss Confederation (Schweizerische Eidgenossenschaft 2016d): <http://www.are.admin.ch/sachplan/04910/index.html?lang=de>

¹⁶ According to a circular from the Swiss Federal Department of the Environment, Transport, Energy and Communications (DETEC), 29.6.2015.

Figure 9: Diagram Land-use change, in m² per Second



Translated from: © Schweizerische Eidgenossenschaft – Bundesamt für Statistik (2013): available at: <https://www.bfs.admin.ch/bfs/de/home/statistiken/raum-umwelt/bodennutzung-bedeckung/bodennutzungswandel.html>

Deutsch	English
Bodennutzungswandel, in m ² pro Sekunde	Land-use change, in m ² per second
Wald, Gebüschwald	Forests, shrubs
Gehölze	Coppices
Landwirtschaftsflächen	Agricultural areas
Alpwirtschaftsflächen	Alpine pastures
Unproduktive Flächen	Unproductive areas
Quelle	Source
<i>Komma zu Punkt in den Zahlenangaben</i>	

In Germany, quantitative soil conservation is a national policy objective. Since the turn of the millennium, annual consumption of land has been noticeably declining but the rate is still more than double the target set for 2020.

One of the milestones identified in the Roadmap to a Resource Efficient Europe (COM(2011) 571 final) is that by 2020, all EU policies take into account their direct and indirect impact on land use in the EU and globally. In the longer term, the aim is to achieve no net land take by 2050.

As the responses to the online survey and the comments made in the workshops show, the compensatory measures stipulated by the authorities for soil consumption caused by mining, quarrying and landfills (Article 7(1), (2) and (4) of the Protocol) now appear to be well-established. Other effective approaches were also mentioned in the online survey, specifically soil improvement schemes and the requirement for a minimum percentage of land to be left unsealed in local development plans (the latter, however, should be taken with a pinch of salt and does not qualify as a compensatory measure).

The online survey also revealed some very positive effects of redensification in residential areas. Best practice spatial development strategies, local development plans and regeneration schemes for villages are other positive examples, also in relation to soil conservation. The dual use of ski runs for agricultural purposes was also mentioned.

An English-language response to the online survey drew attention to specific soil conservation provisions applicable to “construction sites” in mountain regions. Another response submitted in English makes reference to sporadic local measures to combat land consumption, but does not go into detail.

4.1.5 International/Alps-wide cooperation

Pursuant to Article 5 of the Protocol, the Contracting Parties are required to encourage stronger international cooperation, especially with regard to the drawing up of soil registries, soil monitoring, the designation and monitoring of protected and impaired areas and danger zones, the provision and harmonisation of databases and the coordination of Alpine-specific soil conservation research. International/Alps-wide cooperation is also dealt with in Article 19 (Research and monitoring), Article 20 (Establishment of harmonised databases) and Article 21 (Establishment of permanent monitoring areas and coordination of environmental monitoring).

With the proposal for an EU Soil Framework Directive having been withdrawn, the Alpine Convention’s Soil Conservation Protocol is currently one of the few legal frameworks for international cooperation on Alps-wide soil protection. This was generally viewed very positively by participants at the Alpine Soil Symposium, who saw it as offering an opportunity for formal cooperation at the Alps-wide level (with the involvement of the regions).

The projects and initiatives which have been or are currently being implemented by various stakeholders in the Alpine region and contribute to international cooperation on implementing the Soil Conservation Protocol can be rated positively. Alpine soil issues are dealt with by the FAO’s Global Soil Partnership and the national soil science societies, for example. Other European initiatives such as HORIZON 2020’s INSPIRATION work programme¹⁷, which focuses on soil, land use and land management in Europe, and People4Soil¹⁸ – an independent network of NGOs and individuals working to protect Europe’s soils – are also seen in a positive light. DG ENV initiatives such as the current “Updated Inventory and Assessment of Soil Protection Policy Instruments in EU Member States” project further contribute to Alps-wide cooperation on soil conservation.

Individual activities which foster international/Alps-wide cooperation were also mentioned by the experts in the online survey:

- ▶ Participation in the German-Austrian Flächenspar-Forum (Land Conservation Forum) in 2015,
- ▶ Expert opinions for spatial development strategies,
- ▶ Green corridors, mainly in relation to the economical and prudent use of soils,
- ▶ Mapping of risk areas in the designation and management of endangered areas/areas threatened by erosion,
- ▶ Activities relating to agriculture, pasture farming and forestry in the context of participation in the Alpine Convention’s Mountain Agriculture Platform,
- ▶ Interreg B Alpine Space projects.

¹⁷ <http://www.inspiration-h2020.eu/>

¹⁸ <http://www.people4soil.eu/index-en.php#home>

4.2 Critical aspects of the Protocol's implementation

The following critical aspects of the Protocol's implementation on the individual sub-points were identified from the analysis of the online survey, details of which can be found in Annex 1, and the outcomes of the World-Cafés at the Alpine Soil Symposium. The critical aspects are summarised in the subsections and explained in more detail with reference, as far as possible, to the relevant article of the Soil Conservation Protocol.

4.2.1 Risk assessment/erosion

Although a comprehensive and extensive soil erosion sensitivity assessment is available both for the Free State of Bavaria and for Austria, albeit solely for arable land, most respondents described the lack of evaluation bases as problematical and felt that it would be desirable to remedy this deficit. Although agricultural and forest management techniques that limit erosion to a minimum were identified, a link to the Protocol was rarely established. Rather, there was an assumption that these techniques had “always” been practised historically. The Alpine farming community is working hard to preserve its traditional management regime for Alpine pastures.

The following critical aspects in the Protocol's implementation can be identified in relation to risk assessment/erosion:

Evaluation bases/mapping/regional application inadequate

Evaluation bases exist for erosion risk assessment but gaps are still known to exist, particularly in relation to Alpine and forest soils.

Respondents particularly mentioned the lack of evaluation bases (mainly hazard maps, but also work aids, land registry records and appraisal modules) ([Article 1 \(3\)](#) and [Article 11](#)) as being problematical and felt that it would be desirable to remedy this deficit.

The majority of respondents criticised the lack of mapping of Alpine areas threatened by extensive erosion ([Article 11 \(1\)](#)). Only four persons stated that they used erosion mapping in their day-to-day work ([Article 11 \(1\)](#)).

Methodological bases for soil erosion sensitivity assessment were mentioned by respondents but only a small number described them for specific regions ([Article 1 \(3\)](#) and [Article 11](#)).

Specification of good professional practice

Overall, the Alpine farming community is working hard to preserve its traditional management regime (notwithstanding some negative examples). The way in which it is portrayed and evaluated very much depends on the region concerned. Many positive examples were mentioned in relation to forest management. Very few respondents identified a causal connection with [Article 12 \(1\)](#), which concerns management techniques based on sound practices which are adapted to suit local conditions, and [Article 13 \(2\)](#) relating to measures to use and maintain forests. The majority of respondents assumed that these techniques had “always” been practised historically.

4.2.2 Qualitative soil conservation, soil functions

The majority of respondents identified soil functions as an important topic which is relevant to their day-to-day work. However, most of them described the lack of evaluation bases as problematical and felt that it would be desirable to remedy this deficit. Measures referred to in the

Soil Conservation Protocol are not applied in respect of qualitative soil conservation. Existing networks are seen as important and should be expanded.

The following critical aspects in the Protocol's implementation can be identified in relation to qualitative soil conservation/soil functions:

Information on qualitative soil conservation

Although databases exist for soil function assessment, there is considerable variation in their use in the member states, and their integration into planning is still minimal. Gaps exist primarily in relation to Alpine and forest soils. In addition to existing methodologies, other technical approaches were mentioned, such as soil earthworm surveys.

Methodological bases for soil function assessment were mentioned by a number of respondents but it was only possible to assign them to specific regions to a limited extent (**Preamble, Article 1 (3), Article 8 (2)**). There is considerable regional variation, therefore, in the implementation of specific measures to protect soil functions and in the availability of evaluation bases for soil functions or work aids that can be integrated and utilised day to day.

Respondents particularly mentioned the lack of evaluation bases (mainly soil function maps, appraisal modules, work aids and training but also land registry records and soil maps as baseline information) (**Preamble, Article 1 (3) and Article 8 (2)**) as problematical and felt that it would be desirable to remedy this deficit (see Annex 1).

Legal and administrative measures

The measures referred to in the Soil Conservation Protocol are not applied in practice, other than in relation to fragile soils.

Although the safeguarding and preservation of the ecological functions of soil, defined as an objective in **Article 1 (2) of the Protocol**, is also a specified aim of many other items of legislation, a causal connection between implemented measures and **Article 1 (3)** is identified and experienced solely in *Land Salzburg*. This causal connection can be explained by the fact that in *Land Salzburg*, the Soil Conservation Protocol is an important legal basis for soil function assessment and the integration of a requirement for such assessment in planning and approval procedures. In *Land Tyrol*, the Soil Conservation Protocol is regarded as a legal backstop, while in *South Tyrol*, there is an awareness that preservation of soil functions is one of the objectives of the Soil Conservation Protocol.

Role of existing networks

Existing networks are rated highly. At present, however, these networks are not being utilised to an adequate extent for soil-related transboundary (=Alps-wide) activities.

4.2.3 Mountain farming, forestry and wetlands/moors

The catalogue of agri-environmental schemes includes not only effective measures that promote sustainable management practices but also a number of schemes which, in the view of the consulted experts, are more likely to do the opposite. Incentives of a fiscal nature and funding schemes for the construction of forest and Alpine roads and for highways for municipalities and districts, but also business tax and a lack of exclusion criteria when determining land uses (in area development planning) are particularly problematical.

The conservation of moors and wetlands, described in Section 4.1.3 above, is safeguarded – in theory – by relevant nature conservation legislation (at international and EU level) and by **Article 9 of the Protocol**; in practice, however, it is often patchy and is regarded as inadequate. It is apparent that exemptions are very often made, mainly for the benefit of infrastructure projects (ski runs, human settlements, other individual interests); in other cases, the provisions of soil conservation legislation are not given adequate consideration due to a lack of knowledge on the part of the authorities issuing the permits. In some countries, the Soil Conservation Protocol does not go far enough to ensure adequate protection for moors and wetlands; in some cases, there is a lack of baseline information or the toolkit needed to enforce conservation goals is inadequate. Soil-related factors are generally regarded as secondary issues or are not given sufficient attention in evaluations (e.g. in relation to eutrophication, drainage and the resulting changes in soil quality). This mainly affects fen soils that are used for farming, although these soils in particular make a key contribution to climate protection, which is not acknowledged to an adequate extent in soil conservation.

Examined in more detail, the most frequently mentioned impairments resulting from agricultural use include the following:

- ▶ Ploughing up of grassland and its impacts: greenhouse gas emissions, biodiversity loss, water runoff, erosion
- ▶ Intensification of grassland use (frequency of mowing, fertiliser use, etc.) and arable farming in wetlands (impact = biodiversity loss)
- ▶ Drainage schemes, resulting in drying out of wetlands, moors
- ▶ Arable farming and inappropriate/non-sustainable tillage, increasing vulnerability to erosion and loss of soil organic matter (SOM)
- ▶ Treading damage caused by the hooves of grazing animals, resulting in the formation of pseudogleys
- ▶ Destruction/severe degradation of fen habitats in Alpine pastures due to intensive grazing
- ▶ Abandonment of extensive grassland (bush encroachment)
- ▶ Afforestation of wetlands (loss of area)
- ▶ Manure management (nutrient input, fertiliser application)

As described in Section 4.1.3, the definition of good professional practice (GPP) can serve as a basis for sustainable soil management. In the Alpine region, however, the technical and legal bases for GPP currently vary from country to country (Nitrates Directive, cross-compliance, forest management with minimal environmental impact, etc.). Interpretations of good professional practice (GPP) also differ, in some cases considerably, depending on which institution has provided the definition. Soil conservation aspects are not always given the attention they deserve, and implementation is consistently weak.

In relation to substance inputs from agriculture and forestry, too, the assessment tends to be critical. Even when there is compliance with the Regulation, inputs – especially nitrogen (N) – are far too high; in some cases, this is due to poor monitoring of the Fertilisers Regulation. It was also noted critically that the Alpine regions shift responsibility for dealing with the issue of sewage sludge and waste to lowland areas, even though wastewater and waste are produced in the Alps as well.

There is growing pressure on agriculture to switch to intensive grazing (including fertiliser use) in the Alpine regions, with the result that the use of liquid manure is transforming flower-rich meadows into carpets of monotone green in mountain areas as well.

4.2.4 Quantitative soil conservation

The results of both the online survey and the expert workshops clearly show that the Protocol's quantitative soil conservation objectives have not been achieved in the majority of participating states. Shortcomings in implementation include the following:

National and to some extent regional differences in survey techniques and data compilation status

An internationally coordinated and reliable overview of land consumption within the perimeters of the Alpine Convention does not exist. Shortcomings were identified in data quality, data collection for the region as a whole, timeliness and international comparability. There are also considerable differences relating to the topics to be addressed. Basic evaluation problems have not yet been fully resolved (e.g. the definition of "high-value soil"). There is generally insufficient linkage between quantitative (soil consumption) and qualitative aspects (soil functions). The concept of virtual soil consumption, caused by the global trade in goods, does not feature in data collection at all¹⁹.

Lack of transnationally agreed target figures and management strategies

The objectives set in the Protocol are operationalised in highly diverse ways at the national level. In Switzerland, a comprehensive ban on conversion has been in place for many years, with tight restrictions on settlement growth combined with clear prioritisation of brownfield development. In Germany, quantitative soil conservation is a national policy objective; here and in Austria, longer-term target figures have been set (but were not agreed transnationally), although Austria, at least, has notably failed to meet them. The situation is similar in the Slovenian and Italian Alps, where there is the additional problem of farmland having fallen into disuse.

Existing tools are ineffective

The long-established standard tools – land-use and development planning and strategic environmental assessment (SEA) – were viewed very sceptically by the experts (who described them as "too soft"). There was further criticism with regard to the insufficient use of available instruments and the fact that building and planning law is largely under the jurisdiction of municipalities, which also has a detrimental effect in terms of land take.

Only 10% of all respondents are of the opinion that soil protection laws (where applicable) are proving effective, whereas 50% consider them as being non-effective to a large extent. This may be due to the fact that soil protection laws primarily deal with qualitative soil protection issues, whereas the quantitative aspect only plays a role in exceptional cases.

4.2.5 International/Alps-wide cooperation

The findings of the expert survey and Symposium show that there is a need for action in relation to practical international/Alps-wide cooperation. The experts identified a number of critical aspects relating to Alps-wide cooperation, along with various measures that should be taken to improve the implementation and effectiveness of the Soil Conservation Protocol over the long term.

Lack of attention to specific measures and topics in international cooperation

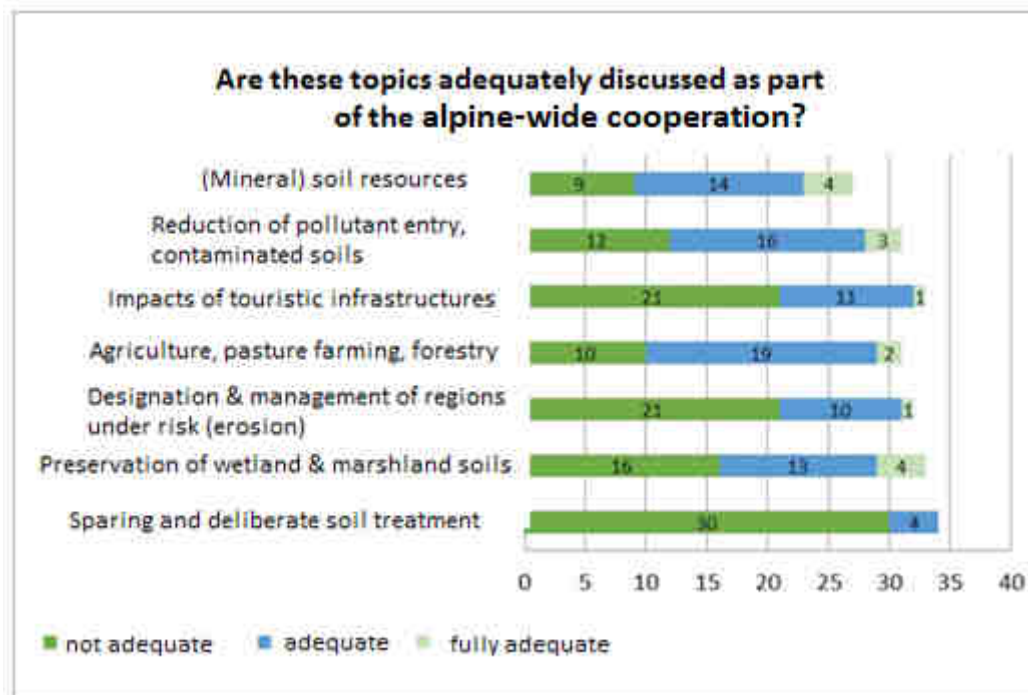
The topics and specific measures stipulated in the Protocol (Chapter II) are not addressed in international cooperation to an adequate extent. "Economical and prudent use of soils" receives

¹⁹ Defined as "total direct and indirect resource use associated with imports serving domestic final consumption" (Giljum et al., 2013, 8)

the least attention. However, this topic is regarded as particularly important for successful international cooperation and implementation of the Soil Conservation Protocol as a whole (see Figure 10).

Other topics – “Conservation of soils in wetlands and moors”, “Designation and management of endangered areas/Alpine areas threatened by erosion”, “Agriculture, pasture farming and forestry”, “Effects of tourism infrastructures” and “Limiting inputs of harmful substances” are also inadequately addressed in international cooperation and should be regarded as critical aspects in the Protocol’s implementation (see Annex 1). In addition, it was emphasised at the Symposium that the topics of data availability and harmonisation, agriculture and forestry, erosion and climate protection are not being dealt with to an adequate extent Alps-wide.

Figure 10: Sufficient discussion of the topics relating to the alpine BodP/international cooperation



© blue!, 2016

Deutsch	English
Werden diese Themen ausreichend in der alpenweiten Zusammenarbeit behandelt?	Are these issues addressed to an adequate extent in Alps-wide cooperation?
Bodenschätze	Mineral resources
Begrenzung von Schadstoffeinträgen, kontaminierte Böden	Limiting inputs of harmful substances, contaminated soils
Auswirkungen touristischer Infrastruktur	Effects of tourism infrastructures
Land, Weide- und Forstwirtschaft	Agriculture, pasture farming and forestry
Ausweisung und Behandlung (erosions-) gefährdeter Gebiete	Designation and management of endangered areas/areas threatened by erosion
Erhaltung der Böden in Feuchtgebieten und Mooren	Conservation of soils in wetlands and moors
Sparsamer und schonender Umgang mit Böden	Economical and prudent use of soils
Anzahl der Nennungen	Number of mentions
Nicht ausreichend	Inadequate

Ausreichend	Adequate
Voll ausreichend	Completely adequate

Lack of Alps-wide/international networking

The lack of Alps-wide networking/cooperation was generally regarded as particularly critical, as it leads to inadequate implementation of the Soil Conservation Protocol in relation to topics and measures alike. The absence of an Alps-wide forum with a thematic focus on soil, the lack of attention to the Soil Conservation Protocol within the Alpine Convention framework and the gap where an Alps-wide soil conservation working group/platform should be are just some of the reasons why Alps-wide cooperation is inadequate.

Inadequate knowledge transfer

Associated with this is the inadequate knowledge transfer at Alps-wide level, which is regarded as a critical factor in relation to the lack of practical international/Alps-wide cooperation. According to the experts, the lack of knowledge transfer affects various levels (Alps-wide to local), with particular impact at the local/municipal level.

4.3 Solution-based approaches

This section (4.3) introduces the solution-based approaches proposed by the experts in the online survey and the World-Cafés at the Alpine Soil Symposium in order to improve implementation of the Soil Conservation Protocol. It should be noted at this juncture that there may be some thematic overlaps between the various solution-based approaches/proposals described in the individual subsections. The aspects are initially summarised in the subsections and then explained in more detail with reference, as far as possible, to the relevant article of the Soil Conservation Protocol. In the online survey, participants had the opportunity to address other broader or more general aspects relating to the Protocol's implementation status. A particular effort was made to elicit information about activities and measures which are not yet covered adequately or at all by the Protocol, and also about future activities and recommendations on ways of improving the Protocol's implementation. These solution-based approaches are presented in section 4.3.6.

4.3.1 Risk assessment/erosion

For most respondents, solution-based approaches in this area should include the provision of evaluation bases, e.g. hazard maps, training, work aids and land registry records. For the management of Alpine pastures, a more detailed specification of good professional practice, e.g. supported by best practice examples, was identified as a suitable approach.

The following solution-based approaches can be identified in relation to qualitative soil conservation/soil functions:

Provision of methodological bases

Some of the respondents identified the following as particularly desirable methodological bases for soil function assessment (**Article 1 (3) and Article 11 of the Protocol**): high-resolution hazard maps, training, flyers, work aids, land registry records and appraisal modules (e.g. as a Web GIS application). They also noted other types of soil assessment, as well as site mapping.

Erosion hazard maps should therefore be made extensively and easily accessible, e.g. through a Web GIS application.

Specification of good professional practice

A technical discussion about pasture farming is needed (**Article 12 (1)**). It would be helpful, in this context, to compile some best practice examples in the interests of shared learning.

4.3.2 Qualitative soil conservation, soil functions

Most respondents described uniform evaluation bases (soil function assessments for the area as a whole, mapping of forest and mountain pastures, work aids to support implementation, inclusion of clearer objectives in the Protocol) as solution-based approaches. Specification of the content of the Protocol, e.g. with the formulation of specific measures relating to the general objectives, would be desirable. In addition, existing networks should be supported in making their soil-related activities visible.

The following solution-based approaches can be identified in relation to qualitative soil conservation/soil functions:

Information on qualitative soil conservation

Soil function assessment that is based, as far as possible, on uniform criteria and covers the whole area at 1:25,000 (or more detailed) scale would be desirable (in Bavaria, an overview soil map is available for the territory of the entire state). Mapping of forest and mountain pastures is also required (woodland and forestry data are not currently available to the public). A work aid for the implementation of the soil function assessment in spatial planning is also necessary. The Protocol should include more precisely defined targets and measures here.

Some of the respondents identified the following as desirable methodological bases for soil function assessment (**Preamble, Article 1 (3) and Article 8 (2) of the Protocol**), particularly soil function maps, appraisal modules (e.g. as a Web GIS application), training, flyers, work aids, but also land registry records and soil maps as baseline information. Soil function maps should therefore be made extensively and easily accessible, e.g. through a Web GIS application.

Legal and administrative measures

Improved substantive specification of the Protocol, e.g. with the formulation of specific measures relating to the general objectives, would be desirable.

Two options, both of them controversial, were proposed to improve the situation:

- Substantive specification in the member states with overall, transnational coordination – versus –
- Utilisation of the Protocol with its targets simply as a guideline for national implementation, but then including substantive specification based on other provisions.

Further expansion of existing networks

Existing networks should be supported in making their soil-related activities visible and in evolving towards Alps-wide networking. A technical, topical and incident-related information exchange among experts at all levels (public authorities, universities, project applicants, planning offices, interested laypersons) should be enabled in a non-bureaucratic manner.

4.3.3 Mountain farming, forestry and wetlands/moors

In order to improve the conservation of soils in wetlands and moors, some experts proposed establishing linkage between soil protection activities and climate protection goals. This applies specifically to the protection of fen soils, which in many cases are used for agriculture. These soils contribute significantly to climate protection, which has not yet been adequately addressed in the SCP. In this context, it is important to make consistent efforts to ensure that the toolkit is suitable to achieve conservation goals in an effective manner.

In order to move agriculture and forestry towards a form of use which is genuinely suitable for the protection and the preservation of soils, wetlands and moors, further harmonisation, supplementary measures and training are required across a range of sectors and, above all, practical land use must be adapted and/or restructured accordingly. The shared definition of good agricultural practice is a key aspect which needs to be developed by means of appropriate and harmonised legal provisions (Fertilisers Regulation, Sewage Sludge Ordinance, etc.). Agri-environmental programmes must do much more to promote soil fertility and the ecological functions of soils and impose sanctions on harmful management practices. This must be based on intensive dialogue and cooperation with the farming community, although the policy frameworks must be established at the EU level. In practice, this requires the provision of appropriate training (basic and advanced) for farmers, combined with soil conservation advice and field surveys. Effective public relations activities are also required in order to raise general awareness of soil as an issue.

In order to reduce the imbalance in soil caused by the use of manure-based fertilisers (nitrogen, phosphates) at existing sites, a reorientation towards soil-based agriculture is required. In practice, this means that the livestock-to-soil ratio at farm level must be more balanced. This is one of the most urgent tasks to be addressed in the review of Common Agricultural Policy (CAP) principles for the next EU programming period.

4.3.4 Quantitative soil conservation

The following solution-based approaches can be identified in relation to quantitative soil conservation:

Awareness-raising

Awareness-raising efforts regarding the issue of soil loss and lobbying activities in favour of quantitative soil conservation must be increased Alps-wide and best practice examples should generally be promoted. In order to achieve rapid successes, charismatic personalities (e.g. local politicians with long-term thinking) should be encouraged to act as disseminators. In order to raise awareness, learning aids (e.g. for use in schools or as manuals to support decision-making in local spatial planning) should be developed in order to make the economic consequences of soil loss transparent (e.g. total cost calculator at the municipal level).

Planning framework

The definition of “good soil” must be standardised at an Alps-wide level (soil functions, soil life, scarcity, recoverability). On that basis, the harmonisation of land take must be carried out, based on Alps-wide monitoring and uniform criteria; in particular, consumption figures with qualitative aspects should be compiled (soil quality rating).

Easy-to-use soil function maps to cover the entire Alpine region, modelled on those available in Upper Austria or Salzburg, for example, should be produced for planning purposes, based on a pragmatic approach, with a particular focus on soil ecosystem services.

Management tools and planning

The communication between national authorities must be improved, e.g. via the new spatial planning platform established within the Alpine Convention framework. For the subsidiary departments, clear procedural instructions must be developed.

Agricultural development programmes must be restructured and, above all, linked to a long-term obligation to continue cultivation.

Strategic environmental assessment must be enhanced by adding soil-related objectives (based on the *Land Salzburg* model).

The coordinating and leading role of regional planning must be revived and/or development planning and building competences shifted to an intra-communal level, with the following primary objectives:

- ▶ Compact, high-density construction with prioritisation of brownfield development
- ▶ Strict protection of (high-value) agricultural land
- ▶ Improved coordination among municipalities: “Who takes which industrial site?” – inter-communal balance
- ▶ Mandatory follow-on use for existing buildings
- ▶ New construction to be focused on sites with poor soil functions
- ▶ Mandatory compensation to be paid for land consumption (modelled on forest legislation).

A significant price increase for land take should be achieved as follows:

- ▶ Introduction of a land consumption tax (= penalty for destroying soil functions)
- ▶ Abolition of commuter (travel) allowance
- ▶ Introduction of land certificates based on the model of emissions trading.

4.3.5 International/Alps-wide cooperation

Most experts proposed and called for solution-based approaches to improve networking among soil conservation stakeholders and activities in the Alpine region.

Networking of soil conservation stakeholders: towards a viable working group

Given that Alps-wide networking/cooperation on soil conservation is regarded as inadequate, it would be desirable to establish a viable working group. Stakeholder networking should take place at both the sectoral and the horizontal level and should culminate, in the longer term, in the establishment of a formal working group which would involve all the Alpine regions in cooperation and create more influence and authority for the network. In order to improve synergies and dialogue, existing networks, projects and stakeholders (e.g. the European Land and Soil Alliance (ELSA), the soil science societies, EU-wide and Alpine (research) projects) should also be involved.

More intensive Alps-wide exchange on technical issues and future challenges

In order to address and respond more effectively to challenges and soil conservation issues in the Alps in future, more intensive Alps-wide exchange on technical issues is desirable. Land

consumption/integration into spatial planning, data availability and harmonisation, climate protection, agriculture/forestry and erosion are all identified as important issues.

In particular, the more intensive Alps-wide cooperation on qualitative soil conservation/land consumption/integration into spatial and regional planning should be pursued as a solution-based approach as this particular nexus is viewed as particularly important for future soil conservation and there is currently a gap here (see also Sections 4.2.4 and 4.3.4).

The linkage between climate and soil conservation is not addressed to an adequate extent in the Soil Conservation Protocol, according to the experts; this should be remedied through the inclusion of more detailed provisions in the Protocol and dealt with through an Alps-wide approach.

Improved Alps-wide knowledge transfer

It was noted that stakeholders within the Alpine space often lack knowledge with regard to relevant soil conservation experts (“Who does what?”), soil conservation activities and projects, possible soil conservation problems or good practices in other regions and countries. In order to implement the Soil Conservation Protocol on an Alps-wide basis and to overcome the challenges arising in soil conservation, more intensive knowledge transfer and the inclusion of local stakeholders in particular (e.g. municipalities, mayors) on an Alps-wide level is a possible solution-based approach, since these stakeholders play an important role in the Protocol’s implementation. Efforts should therefore be made, over the long term, to improve local awareness of soil conservation and the Protocol as a practical tool. As a way of improving Alps-wide knowledge transfer, a permanent Alpine soil conservation website is proposed. The website would provide information about various soil conservation issues, projects and stakeholders (e.g. public administration, the research community and practitioners) and showcase examples of best practice.

4.3.6 Broader and more general issues

In the online survey and also at the Alpine Soil Symposium, various critical aspects of a more general and wide-ranging nature were addressed by the experts and various solution-based approaches which may help to improve the Protocol’s implementation were proposed. These critical aspects and solution-based approaches can be summarised as follows:

Technical issues and activities

Although the Protocol covers the majority of topics of relevance to Alps-wide soil conservation, the experts felt that it did not adequately address the issue of economical and prudent use of soils (Article 7). The Protocol should include specific threshold and guide values and provide for sanction mechanisms to support quantitative soil conservation, limit the overbuilding of soils and curb growing land consumption and loss of good soils in an effective manner.

The provisions on harmonisation of methods, standards and interpretations in relation to soil data collection are regarded as inadequate. These activities are covered by Articles 5, 11, 20 and 21 of the Soil Conservation Protocol but according to the experts, the relevant provisions are not sufficiently precise (in relation to specific activities, procedures, etc.) in order to achieve effective implementation of the Protocol.

The issue of permafrost, particularly in relation to climate change, and the linkage between soil conservation and climate change adaptation are scarcely mentioned in the Protocol and should be given greater emphasis in future.

Legal force

In general, the experts regarded the Protocol's lack of binding legal force as a critical issue. The Protocol makes no provision for prohibitions and sanction mechanisms, financial compensation or incentives to increase its legal force, with the result that implementation is inadequate. Legal harmonisation and a comparison of binding national and regional statutory provisions pertaining to the Soil Conservation Protocol (and their publication at various levels) could help to give the Protocol more validity in law (it should be noted, however, that Switzerland has not ratified the Protocol).

Awareness-raising, knowledge transfer, publicity and lobbying

According to the experts, it is essential to raise awareness of soil issues, both at local level and among policy-makers/decision-makers; this would do much to improve implementation of the Soil Conservation Protocol. The Protocol does not include specific provisions on awareness-raising and knowledge transfer, which means that there is no mandatory requirement for these activities to be carried out Alps-wide. In order to implement the Protocol, there is a general need for action to improve public relations, knowledge transfer and awareness of soil conservation. As there is a very low level of knowledge of the Protocol at the implementing (i.e. municipal) level, according to the experts, measures should be taken to raise awareness of the Protocol itself and the extent to which it has legal validity.

The provision of best practice examples, in relation to soil conservation and the Protocol's application, encourages replication by other stakeholders and was mentioned by the experts as a desirable measure. Specifically, they called for more symposia, seminars and workshops with a practical focus (such as the Alpine Soil Symposium in Bad Reichenhall on 23-24 June 2016). The role of the ecosystem services concept in making the fragmented issue of Alps-wide soil conservation easier for users (at the local/regional level) to understand was viewed as important by the experts.

Improving knowledge transfer and dialogue at international level was mentioned by the experts several times (see Section 4.2.5 on international/Alps-wide cooperation). There was a particular demand for a joint information platform for the sharing of experience (such as the Austrian Soil Platform) and improved Alps-wide cooperation among public authorities and policy-makers in the EUSALP framework. In order to make practical measures more effective, it is essential to improve the comparability of information and knowledge within countries and regions and between the various Alpine states, according to the experts.

The current lack of knowledge about soil conservation, the Protocol itself and its application, both at local and at political level, was mentioned frequently in the survey and during the Symposium, which indicates that it is a significant problem affecting the Protocol's implementation.

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6 Annexes

6.1 Annex 1: Consultation of experts on the “Assessment of the implementation and effectiveness in the Alpine region of the Alpine Convention Soil Conservation Protocol”: Analysis of the online expert survey

The **aim of the survey** was to get feedback from experts in the public administration, in the scientific community, in NGOs and from private soil conservation actors on the assessment of the implementation and effectiveness of the measures under the Alpine Convention Soil Conservation Protocol. Additionally, the survey was designed to identify Alpine-wide problems in soil conservation and devise recommended actions for future joint measures to be taken in order to improve soil conservation in the Alpine region, an issue that jointly concerns all actors in the Alpine states.

General part

Introduction

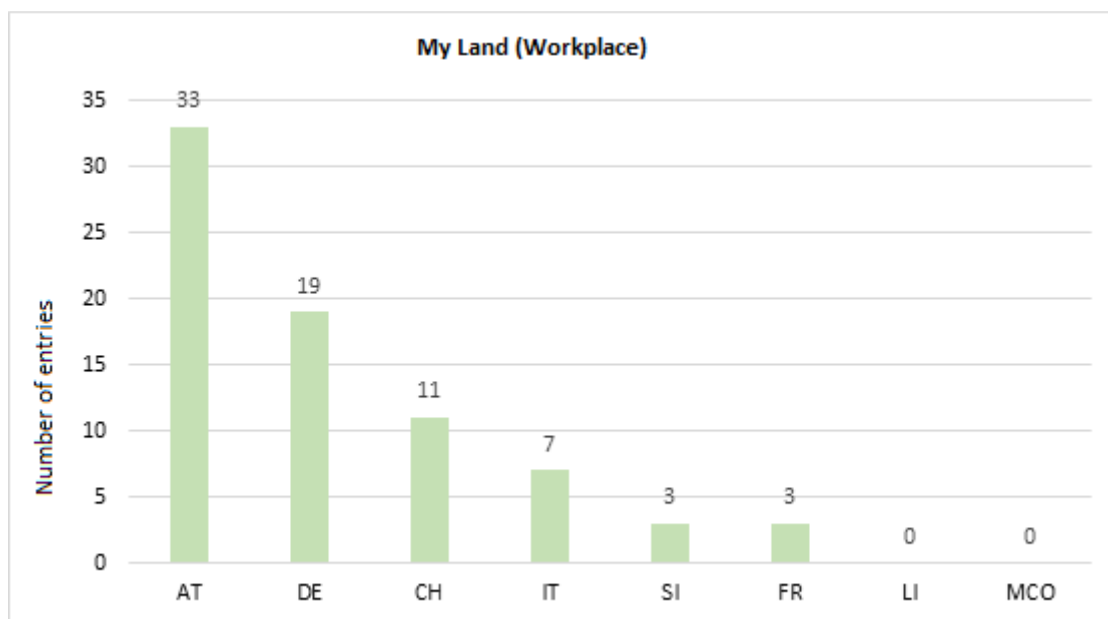
A total of **220 experts** in the Alpine states (AT, CH, DE, FR, IT, LI, MCO, SI) who are active in soil conservation and relevant sectors, such as spatial planning, forestry or water management were administered a quantitative written online survey on the status of the implementation of the Soil Conservation Protocol. **Eighty-two persons or 37%** of the experts to whom the written survey was administered responded. A response rate of 37% (calculated as a maximum response rate considering all respondents) can be considered to be favourable.

For general conclusions on the respondents’ background and their technical expertise, the general part of the questionnaire contained questions on their place of work, operational level, sectoral expertise and the specialist topics with which the respondents are involved. The general part finished with the question on the relevance of the Soil Conservation Protocol in the respondents’ daily work in order to get an initial general impression as to the practical application of the Soil Conservation Protocol.

Question 2. My country (Place of work)

Survey result

This question was answered by 76 respondents. Six respondents skipped this question. The majority of survey respondents (43.4% or 33 respondents) work in Austria, 25% in Germany (19 respondents) and 15% (11 respondents) in Switzerland. Seven respondents (9%) stated Italy as their place of work while 3 respondents (4%) each worked in France and Slovenia respectively. None of the respondents named Lichtenstein or Monaco as their place of work.

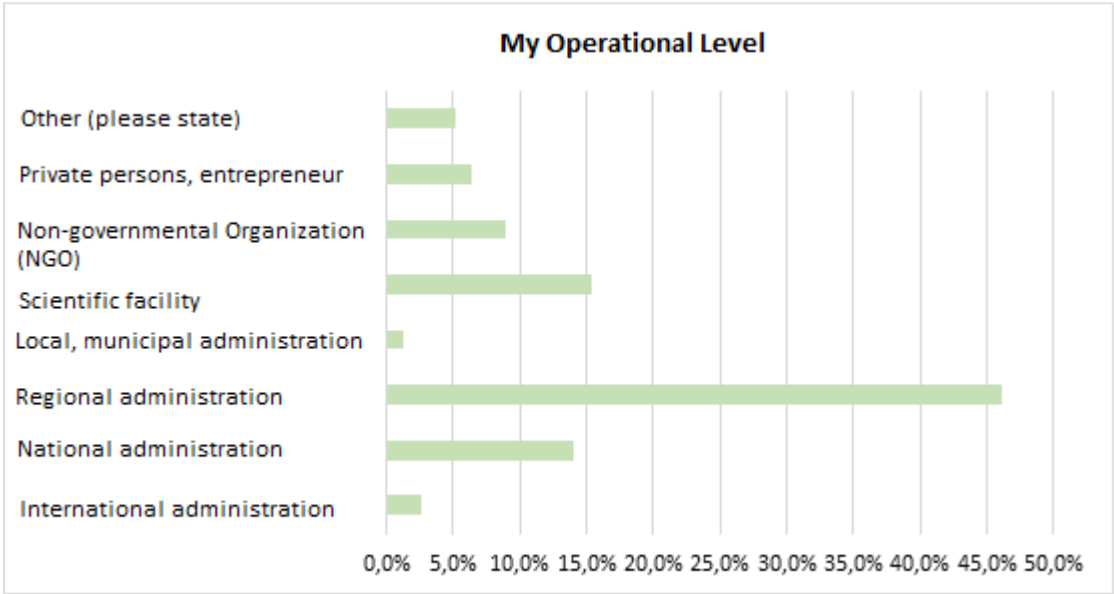


The majority of respondents work in the German-speaking Alpine region, as expected. A total of 82.9% of the respondents work in Germany, Austria and Switzerland. Among other factors, this is due to the fact that the online survey as part of the project was administered in German and English. The need for non-German speakers to answer questions in English can be a barrier, especially when it comes to technical questions.

Question 3. My operational level

Survey result

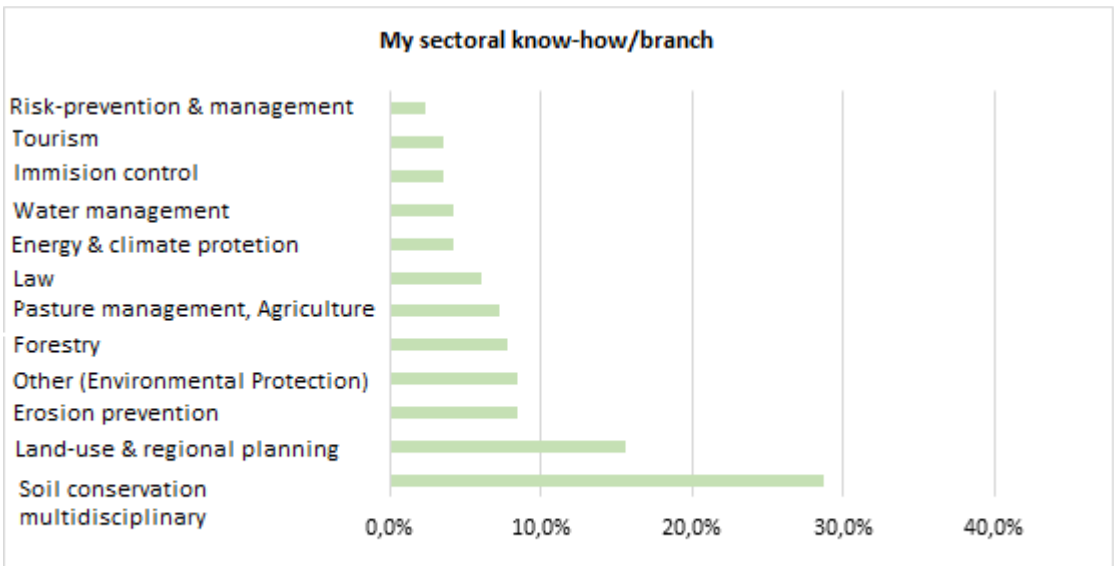
The question as to the operational level at which the respondent works was answered by 78 respondents. Four respondents skipped this question. The majority of respondents stated that they are working in regional-level administration (46% or 36 respondents), while 15% or 12 respondents work in scientific institutions and 14% (11 respondents) in national-level administration. Significantly lower numbers of respondents (between 9% and 1%) work in non-governmental organisations, as private citizens/business owners, in internal administrations or in local municipal administrations.



Question 4. My sectoral expertise/field (multiple responses allowed, please select at least one):

Survey result

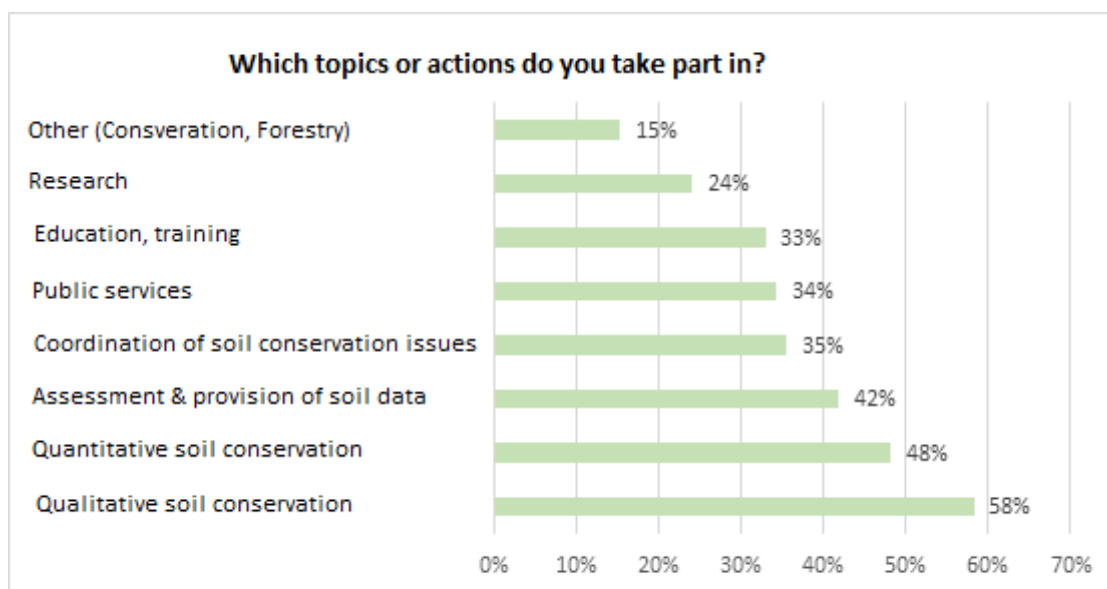
The question with regard to sectoral expertise or the field in which the respondents are active was answered by 78 and skipped by 4 respondents. The majority of respondents stated to have expertise in cross-sectoral soil conservation issues. The most frequently named fields were spatial and regional planning, nature conservation/environmental protection (named under “Other”) as well as erosion control and forestry. Risk prevention, pollution control and tourism were the least-mentioned areas of expertise. The respondents represent balanced expertise in almost all areas of soil conservation, with a focus on spatial and regional planning.



Question 5. What issues are you dealing with/what activities are you involved in? (multiple responses allowed, please select at least one):

Survey result

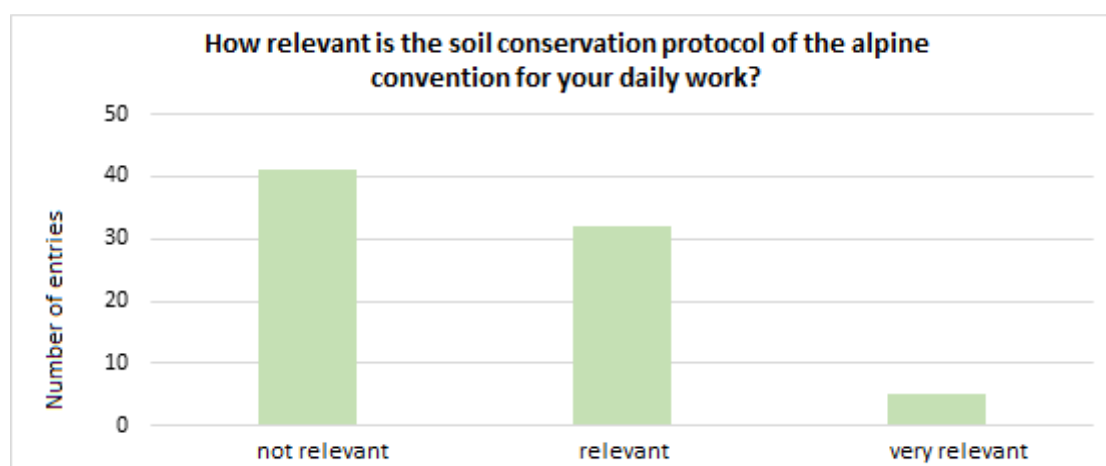
Seventy-nine persons answered the question on issues or activities they are dealing with or are involved in while 3 respondents did not answer the question. Multiple responses were possible for this question so as to allow for all the different topics and activities to be recorded. A total of 79 entries was recorded. The majority of respondents (58%) are involved in activities related to qualitative soil conservation, while 48% are involved in activities related to quantitative soil conservation. Many of the respondents (42%) are also actively involved in the provision and recording of soil data. Approximately 30% each of the respondents are involved in the coordination of soil conservation topics, public relations work, and education and training respectively. Twenty-four percent of the respondents are involved in research activities and only 14% are involved in other issues/activities (e.g. nature conservation, forestry). Overall it can be said that the respondents do not represent a “singular competence” but deal with a balanced range of issues covering almost all topics.



Question 6. How relevant is the Alpine Convention’s Soil Conservation Protocol in your daily work?

Survey result

The question of the relevance of the Alpine Convention’s Soil Conservation Protocol for their daily work was answered by 78 respondents and skipped by 4 respondents. Of those who answered the question, 41 respondents (53%) stated that the Soil Conservation Protocol is not relevant to their daily work while 32 respondents (41%) stated that the Protocol is of relevance in their daily work. Only 5 respondents (6%) regard the Soil Conservation Protocol as highly relevant to their daily work.



From the responses, it is evident that for more than half of the respondents the Soil Conservation Protocol hardly plays a role or is of much relevance in their daily work. Twenty-four of the respondents even stated that the Protocol is “not at all relevant” in their daily work. The Soil Conservation Protocol therefore plays no role at all in the implementation of the work undertaken by 31% of the respondents. However, given that 41% of the respondents stated that the Protocol is of relevance in their daily work, it is reasonable to conclude that there are applications for the Protocol in these respondents’ practical work. Nonetheless, it is notable that only 6% or 5 respondents stated that the Soil Conservation Protocol is highly relevant to their daily work, which means that in day-to-day operations the Protocol is only highly relevant in exceptional cases. Overall, it can be said that the Soil Conservation Protocol is largely of no relevance or little relevance to day-to-day work and is highly relevant only in a small number of cases.

Questionnaire section on: Legal implementation

The Alpine Convention, formally known as the Convention on the Protection of the Alps, is a Treaty under international law for the comprehensive protection and sustainable development of the Alpine region. The Soil Conservation Protocol has been ratified by all Contracting Parties to the Convention except for Switzerland. Ratification means that the signatory country to the Protocol will transpose it into national law, thus giving it full legal effect within the country’s territory.

The questionnaire section on “Legal implementation” was completed by 60 and skipped by 22 respondents (60 of 82 = 73%).

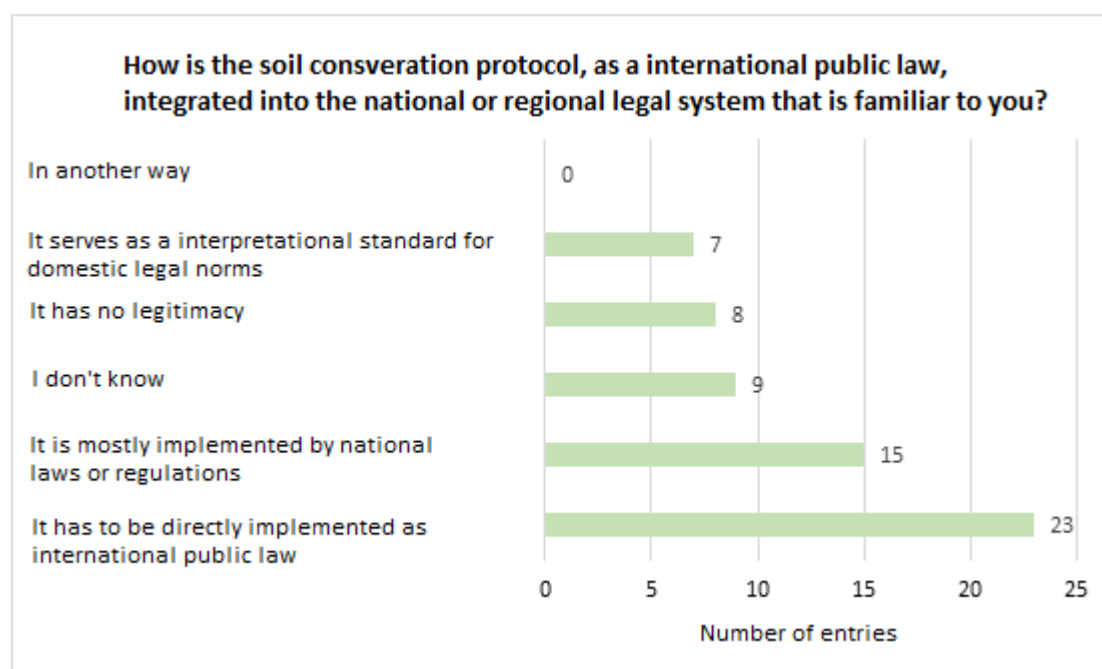


Question 7. How has the Soil Conservation Protocol as an international treaty been integrated into your country's or region's legal system, as known to you?

The Alpine Convention is a treaty under international law between sovereign states (8 Alpine states and the EU). It is therefore a type of legislation that cannot be forced upon individual states, asserted in a court of law or enforced by police. There are however other mechanisms that ensure relatively good compliance with international treaties, such as for example the principle of reciprocity or so-called compliance procedures²⁰. In the case of the Alpine Convention there is the so-called Compliance Committee which regularly monitors the implementation status and compliance with certain protocols. Such an assessment is currently underway for the Soil Conservation Protocol. The way in which the Protocol has been integrated into national legal frameworks differs between countries since the individual Alpine states have different legal systems.

The question on how the Soil Conservation Protocol as an international treaty has been integrated into the legal order, as known to the respondent, was answered by 51 respondents (51 of 82 = 62%).

²⁰ cf. Alpenkonventionsbüro der CIPRA Österreich im Umweltdachverband (2015): Die Alpenkonvention. Nachhaltige Entwicklung für die Alpen. Nummer 79, 02.2015



Six more detailed explanations were included with the above answers by respondents; these probably refer to individual Alpine states as follows:

Position of the Soil Conservation Protocol (SCP) in national law	Country
Experience suggests that at the regional level the SCP is not “on the radar” and therefore tends to not be taken into account or is only taken into account following strong lobbying on the part of bodies with a statutory consultative role. Nature conservation concerns are always prioritised and are not treated as equal to but as more important than soil conservation concerns.	DE
In Austria, [the SCP] is similar in character to a federal law and is directly applicable.	AT
Acts passed in the Parliament without any proviso are based on the assumption of direct applicability.	DE / AT
The provisions are largely declaratory in character.	DE
De facto a nice paper, but unenforceable in proceedings; authority always makes reference to alleged transposition into national legal provisions; quantitative soil conservation by way of (highly political) spatial planning law does not work.	DE
To the best of my knowledge, Switzerland has not ratified the Soil Conservation Protocol. But national law is already fairly congruent with the intentions of the Alpine Convention.	CH

Brief interpretation of the result

More than half of the respondents view the Protocol as an effective legal remedy which applies indirectly through its transposition into national law or which has direct effect (AT). Some of the respondents are of the opinion that at the regional level the Soil Conservation Protocol is often not “on the radar” but that it may be a basis of national or regional laws and regulations. Switzerland

apparently pursues a soil conservation policy the objectives of which are quite congruent with those of the SCP.

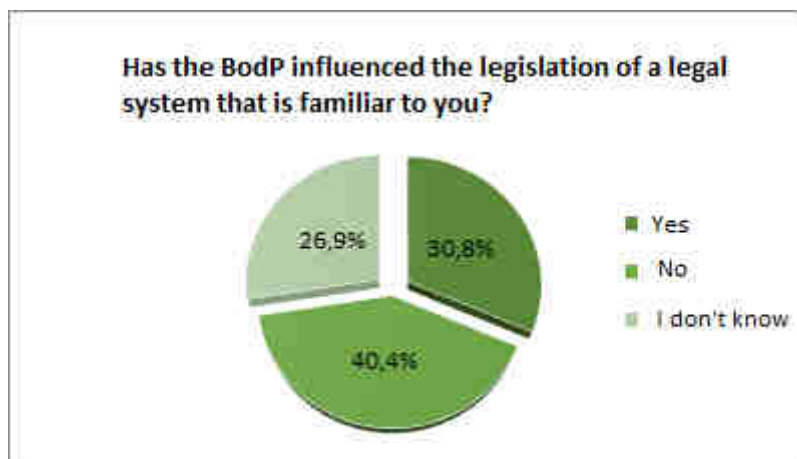
Question 8. Has the Soil Conservation Protocol influenced legislation as part of a legal system known to you?

Question 8 was answered by 52 respondents (52 of 82 = 63%).

As was mentioned above, the SCP has direct effect only in Austria, while in the other Alpine states it is initially at most a basis that gives orientation to soil conservation policy or it contributes to the establishment of a legal framework for soil conservation policy, e.g. in Germany, France and Italy. A factor which plays a role in this context is that in these countries the share of the area outside of the scope of the Alpine Convention is significantly larger than the area covered by the Convention.

Survey result

Only 16 of 52 respondents are of the opinion that the SCP has had a direct impact on legislation, and and provide 13 examples to this effect. Twenty-one responses refute any direct connection between the SCP and legal provisions in force. Fourteen respondents were unable to provide reliable information in this regard. One response refers to the greater significance of references to the Alpine Convention as opposed to individual protocols such as the SCP.



The following examples were given:

Examples of legal provisions influenced by the SCP	Country
The German Federal Soil Protection Act was enacted in March 1998 and the Soil Conservation Protocol was signed in October [1998]. It is reasonable to assume that one influence the other.	DE
Large-scale planned terrain modelling in a geo-risk area for ski runs in the Allgäu, revised plans and impact mitigation as well as conditions imposed for soil conservation achieved by bodies with a statutory consultative role; legal provisions influenced in this case were building codes.	AT

Contravention of the Alpine Convention can be grounds for refusing approval when a municipality is seeking approval for its local development plan or its preparatory land-use plan.	DE
Soil conservation → state law	AT
Upper Austrian Soil Protection Act 1993 (named twice)	AT
Salzburg Spatial Planning Act 2009, Salzburg Soil Protection Act 2001 (named twice)	AT
In Tyrol, a High Court ruling (finding of the Higher Administrative Court in the “Mutterer Alm” case) resulted in the development and adoption of a checklist for fragile areas (Article 14).	AT
Spatial development legislation, administrative guidelines [Article 7]	
Denial of planning permission for ski runs in “fragile areas” [Article 14(1)]	Alle
The influence of the protocol on the legislation cannot be established. The fact is that the legislation and some strategic documents (strategies, programmes) include elements mentioned in the protocol.	

Brief interpretation of the result

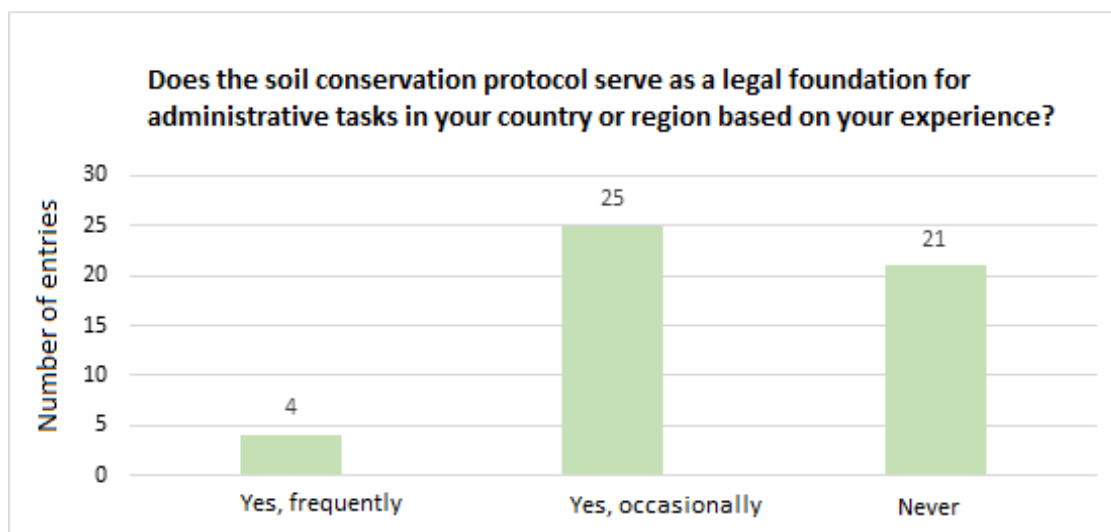
The SCP has influenced laws and regulations in the areas of soil protection, building codes (i.a. on the construction of ski runs), spatial development legislation and soil erosion (agriculture/forestry). Additionally it has created a substantive and legal basis for soil conservation concerns which has helped to shape perceptions of the issue at the strategic level. However, the fact that two thirds of respondents stated that the SCP has not influenced legislation or that they are not aware of any such influence suggests a minor influence on legal provisions known to the respondents.

Question 9. In your experience, is the Soil Conservation Protocol being drawn upon as a legal basis for actions taken by administrative authorities in your country or region (e.g. statutory plans or decisions taken in individual cases)?

Question 9 was answered by 50 respondents (52 of 82 = 61%).

Question 9 is a close examination of the issue as to whether the SCP is possibly being drawn upon as a direct legal basis for regulatory administrative decisions. Given the different conditions in the various countries as mentioned with reference to Question 8, this is not an option in all of the different countries. As a consequence, the value of the statements made by the respondents is impacted by their country of origin.

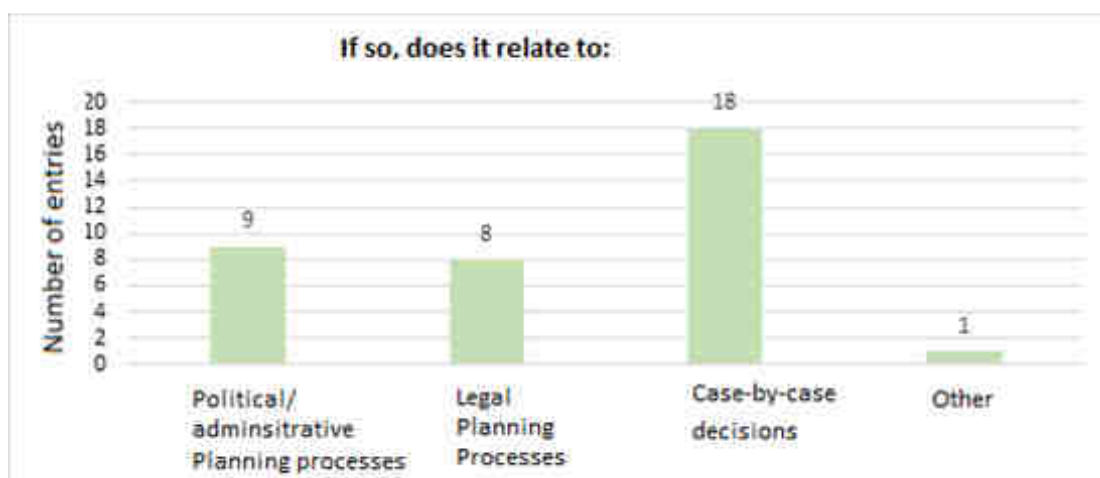
The question as to whether the SCP has been used as a direct legal basis was answered in the affirmative by only 4 out of the 50 respondents, though 25 respondents stated that the SCP was occasionally being taken into consideration. The remainder answered the question in the negative.



Question 9.1. If yes, does this concern ... :

Question 9.1 was answered by 30 respondents (30 of 52 = 58%).

The 30 responses regarding the SCP having been taken into account reference a total of 9 statutory plans, 8 non-statutory plans, and 18 decisions taken in individual cases. The examples given are listed below the chart and include the following cases:



Can you give examples (precedents)? Number of responses: 14

Individual examples of "precedents" given in the online survey (Question 9.1)

Judgement by the Austrian Higher Administrative Court in the "Diabasabbau Saalfelden" (Saalfelden Diabase Quarry) case (VwGH-Erk. vom 24.02.2006, 2005/04/044-25)

Judgement by the Austrian Higher Administrative Court in the "Mutterer Alm" case concerning connectivity between the Mutterer Alm and Axamer Lizum skiing areas (VwGH vom 08.06.2005 (2004/03/0116)) – 5 mentions

Construction of a connection between ski resorts in the area of the Riedberger Horn / Allgäu, DE – case still pending – 2 mentions

Guidelines for ski facilities; approval procedures for ski slopes (balancing of interests), approval procedures for extraction projects; approvals for forest clearance in protective forests
Ski resort developments [in general]
Salzburg State Development Programme 2003
Current revision of the state development programme
Guidance on soil protection in the context of planned developments
Sectoral programme for spatial development and transport (draft)
Spatial planning (in general)
Approvals under conservation legislation/EIA processes, in particular Article 9 (2 mentions)
Turrach Alpine Park
Construction of snow reservoirs in fen complexes
Construction of snow reservoirs in geologically fragile areas

Brief interpretation of the result

Most of the decisions in favour of or against consideration of the SCP as a basis for approval decisions taken by authorities concern the designation of ski resorts and resultant conflicts with conservation concerns or the resorts' environmental impacts in general.

Question 9.2. If not, in your opinion, what are the reasons for the limited application of or the failure to apply the Soil Conservation Protocol?

Question 9.2 was answered by 25 respondents (25 of 82 = 31%).

For greater clarity, the following answers have in as far as possible been grouped by theme. The answers show that the issues the respondents consider problematic are ignorance of the Protocol's content, potential contradictions between the Protocol and legislation in force, the fact that the SCP does not have direct effect, and the fact that decision-makers inside and outside of the administration lack competence to make decisions on matters of relevance to the issue of soil protection. There is, however, one answer which confirms the effectiveness of the SCP and merely calls for its more precise implementation in regulations and enforcement provisions.

Individual responses given in the online survey (Question 9.2)
Vague concepts given in the SCP, e.g. "fragile" areas; imprecise delimitation (i.a. "all Alpine slopes are fragile")
The provisions of the SCP have basically been implemented with the Styrian Spatial Planning Act; therefore, a contravention of the SCP would also be a contravention of the [state] legislation.

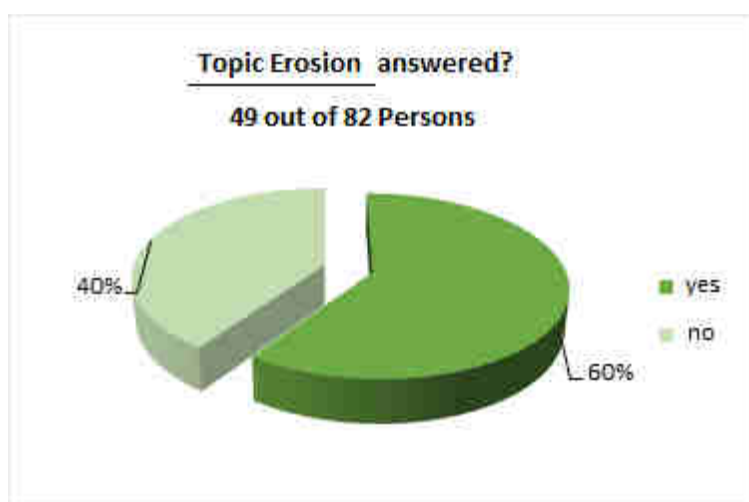
The authority consistently makes reference to the Protocol's alleged transposition into national legal provisions; however, the attempt to achieve quantitative soil protection by means of the (highly political) spatial planning law has not worked.
Application of [national] and regional legislation
The issues that are dealt with in the protocol are included already in different legislation (Agricultural Land Act, Spatial Planning Act, Environmental Protection Act) and strategic documents (i.e. Spatial Development Strategy of Slovenia).
Unsatisfactory transposition or difficulty transposition into national legislation (2 mentions).
It is a programmatic and strategic tool that has become part of common practice. This does not mean however that everything is working smoothly. Improvements are necessary but should take the form of technical guidelines and frameworks rather than that of a political protocol.
Switzerland did not ratify the Soil Conservation Protocol (3 mentions)
[The content] is not known at the cantonal level.
Lower administrative authorities not sufficiently familiar with SCP.
Implementation not legally binding (4 mentions) or no timeframe for it to become legally binding.
Relevance not clear or decision/interpretations undertaken by highest courts.
Insufficient familiarity with legal relevance and actual objectives.
Not sufficiently well known (as yet), as Lower Austria is not typical Alpine area among other reasons.
Knowledge and decision-making competences mostly insufficient (4 mentions).
More directly applicable statements would be desirable.
Ignorance, arrogance, and statute of autonomy
Soil has no lobby, other factors are always taken to be more important in planning.
Economic parameters [take precedence] in decision-making.

Questionnaire section on: Thematic implementation

a) Risk assessment/erosion

The Soil Conservation Protocol lists the aim of controlling erosion as early as in its preamble as one of four core measures. In Article 1 – objectives, the avoidance of erosion is referenced in relationship with measures to be taken. In Article 11 on the designation and management of Alpine areas threatened by erosion the issue is given particular attention.

The segment on erosion was completed by 49 respondents (49 of 82 = 60%).



Question 10: Article 11 (2) SCP sets the target of limiting soil erosion to the inevitable minimum. In your knowledge, what are the measures used to achieve this objective?

- **Known measures** used **to achieve the objective** of limiting soil erosion to the inevitable minimum (**Article 11 (2) SCP**) were listed by 25 respondents as follows:

Known measures used to achieve the objective of limiting soil erosion to the inevitable minimum (Article 11 (2) SCP)	No. of mentions
Advice for managers of agriculturally used land and monitoring of measures	6
Re-establishment of vegetation/re-cultivation as precondition for further licences	5
Maintenance or new establishment of protective forests	4
Support programmes: AEM, Austrian agri-environmental programme (ÖPUL)	4
Awareness-raising among managers	7
Conditions attached to approval processes	6
Torrent control measures and avalanche barriers	6
Statutory provisions	2
Implementation of Water Framework Directive – protection of surface waters	2
Hazard zone plans	2
Others (1 mention each)	6

Question 11: Have the Alpine areas threatened by extensive erosion been mapped in your area of operations/jurisdiction (→ **Article 11 (1) SCP)?**

- 19 of 27 respondents (70%) stated that in their **area of operations/jurisdiction** Alpine areas threatened by extensive erosion have **not** been **mapped** (**Article 11 (1) SCP**) while 8 respondents (30%) stated that they had been mapped.
- 11 respondents listed the following as **public access points** to the maps of Alpine areas mapped pursuant to **Article 11 (1) SCP**:

Publication of maps of Alpine areas threatened by extensive erosion (Article 11 (1) SCP)	No. of mentions
Internet	6
Journal	3
Technical publication	3
Only regional or local scientific case studies	2
Intranet	1
Hazard zone plans	1
Areas were not mapped but modelled	1

- ▶ 11 respondents mentioned the following **accessibility** variants for maps made available pursuant to **Article 11 (1) SCP**.

Accessibility of maps of Alpine areas threatened by extensive erosion (Article 11 (1) SCP)	No. of mentions
Downloadable PDFs	6
Web-based GIS application	4
Analogue map	2
Scientific publication in hardcopy	2
Downloadable *.SHP file	1
Administrative regulation	1

- ▶ Out of 14 respondents, 4 (30%) stated that they are using the maps in their daily work, while the remainder does not. 8 respondents noted the following with regard to their utilisation of maps pursuant to **Article 11 (1) SCP** in their daily work:

Utilisation of maps pursuant to Article 11 (1) SCP in daily work for...	No. of mentions
Expert opinions	6
Expert reports	2
Advice	1
Risk assessment	1
Scientific publication	1

- ▶ As examples of their utilisation of the erosion maps in their daily work 8 respondents listed the following (1 mention each):

Examples of utilisation of erosion maps in daily work	
Tyrol	Kaserstattalm / Stubaitalm (Tyrol)
	Slope in the rear Schmirntal valley (Tyrol)
Styria	Erzberg (Styria, Eisenerz Alps)
Bavaria	Connection between ski resorts in the area of the Riedberger Horn (Oberallgäu District)
	Arable regions in Bavaria (erosion risk maps are available)
	Bavarian Alpine region
France	Various regions in France
	Natural hazard risk mitigation plan (all mountain regions in France)
Europe	EEA reporting (Copenhagen, Europe)
	EUROSTAT indicators for soil erosion (Europe)

Question 12: Are you aware of regions in which measures have been taken or are being taken to control water erosion and to reduce surface runoff in order to protect human beings and material goods (→ **Article 11 (3) SCP)?**

- ▶ Out of 26 respondents, 18 (70%) stated that they are aware of regions in which such **measures were taken** or are being taken in order to protect human beings and material goods (**Article 11 (3) SCP**) while 8 respondents (30%) were not aware of such measures.
- ▶ Out of 18 respondents, 15 (85%) stated that **techniques with minimal environmental impact** were used to this end (**Article 11 (3) SCP**) while 3 respondents (15%) that answered this question in the negative.
- ▶ 17 respondents listed the following **areas for the application of techniques with minimal environmental impact** (**Article 11 (3) SCP**):

Areas in which erosion control measures pursuant to (Article 11 (3) SCP) have been applied	No. of mentions
Water management	14
Forestry	11
Engineering construction	4
Torrent control and avalanche barriers	2
Area-related projects	1
Ski slopes	1

- ▶ 14 respondents mentioned the following **regions and examples** for the application of techniques with minimal environmental impact (Article 11 (3) SCP):

Examples for the application of techniques with minimal environmental impact by region (Article 11 (3) SCP)	
Bavaria	Entire Alpine region: mountain forest restoration, management and restoration of protective forests, engineering structures protecting against mud flows
	Bad Tölz-Wolfratshausen District (Bavarian Alpine foothills): torrent control, construction of forestry roads
	Mühldorf District (Upper Bavaria). Restoration of the river Inn between Jettenbach and Töging
Salzburg	Obertauern
Vorarlberg	Schesatobel: measures taken in the catchment area to mitigate surface run-off and thus erosion in the mud flow section of the ravine.
	Torrent catchments: similar activities as those taken at the Schesatobel, with an emphasis on controlling flows; erosion secondary
Styria	Eisenerz Alps: Erzberg
	Liezen
Austria	Many Alpine valleys
Baden-Württemberg	Neckar river catchment
France	Natural hazard risk mitigation plan (should cover all mountain regions)
Slovenia	No specific examples; undertaken at national level

Question 13: Are you aware of regions in which sound management practices are undertaken that are adapted to suit local conditions and thus are also suited to control erosion (in addition to protecting from harmful soil compaction) (→ Article 12 (1) SCP)?

- ▶ Out of 25 respondents, 21 (70%) stated that they are aware of regions in which such management practices are undertaken (Article 12 (1) SCP) while 7 respondents (30%) answered the question in the negative.
- ▶ 19 respondents listed the following as areas in which such management practices are undertaken (Article 12 (1) SCP):

Areas for the application of sound management practices that are adapted to suit local conditions (Article 12 (1) SCP)	No. of mentions
Arable farming	13
Grassland management	7
Forestry	7
Preservation of moors for water retention	1
Preservation of grassland	1

17 respondents listed the following regions and examples for the application of sound management practices that are adapted to suit local conditions (**Article 12 (1) SCP**):

Regions and examples for the application of sound management practices that are adapted to suit local conditions (Article 12 (1) SCP)	Vorarlberg	Tyrol	Carinthia	Upper Austria	Salzburg	Lower Austria	Southern Tyrol	Bavaria	France	Slovenia
Flachgau/Tennengau Districts: Salzburg's regional programme for the preservation of grassland					x					
Uplands of the rear Schmirntal valley: extensive pasture management with sheep reduces erosion from sliding snow		x								
Alpine foothills: Lake catchment								x		
Krappfeld: EU Project – groundwater protection, but also soil erosion			x							
SoilWaterProtection (BodenWasserSchutz) advisory				x						
Ebersberg District/Glonn: Hermannsdorfer Landwerkstätten (organic farming project)										
Intercropping, mulch seeding; Austrian AEM (ÖPUL), AEM				x	x	x		x		
Support for mixed forests with a view to stabilising forest stands and to make them more resistant to pests and severe weather events (gale force winds)							x			
Fürstenfeldbruck District/Markt Kaufering: "Sustainable adaptation with the power of nature" strategy; biodiversity award								x		
Alpine region: protective forest	x	x		x						
Arlberg	x	x								
Traditional silvicultural practice of selection cutting (<i>Plenterwald</i>) in the north, especially on molasse sites at risk of erosion	x									
Peatland revitalisation (Mandling raised bog in Pongau, Hollersbach freshwater marshes in Pinzgau)					x					
Peatland conservation (Lucia-Lacke protected landscape segment in Pinzgau, southern shore of Lake Zell in Piinzgau)					x					
Natural hazard risk mitigation plan (should cover all mountain regions)									x	
Principle of good practice is established in law and has been incorporated into several guidance documents for education and training										x

These are management practices in the areas of grassland management/grassland preservation, groundwater protection, arable farming, forestry and peatland revitalisation as well as peatland protection.

- Out of 15 respondents, 9 (60%) were of the opinion that the management practices mentioned (**Article 12 (1) SCP**) **go beyond the cross-compliance requirements**, while 6 respondents (40%) did nothing this was the case

- ▶ Out of 19 respondents, 12 (65%) did not consider there to be a **causal and substantive link** to **Article 12 (1) SCP** as these practices had historically “always” been practised, while 7 respondents (35%) did see a connection which they described as follows:

Description of the potential causal and substantive connection to Article 12 (1) SCP	Tyrol	Salzburg	Lower Austria	Southern Tyrol	Bavaria
There is a problem, which in this case is the eutrophication of lakes. Solutions to the problem are being sought (not historical ones). The connection to Article 12 (1) SCP is only theoretical.					x
There is a substantive connection, from soil can as a form of “production capital” to the protection of watercourses from pollution.	x				
There may be a connection to Article 12 (1) SCP, given that as little as 20 years ago support for mixed forests is unlikely to have been much of an issue.				x	
Ban on land-spreading of sewage sludge on agriculturally used land (high altitude mountain pastures and alpine grasslands)					
General ban on land-spreading of sewage sludge	x				
Prevention of the deposition of substances on high altitude mountain pastures (shallow soils)	x	x			
Alpine Convention / SCP is an argument for the allocation of financial support		x			
Measures are implemented pursuant to the Austrian AEM (ÖPUL)			x		

Question 14: Are you aware of regions in which forests are used and maintained in such a way that soil erosion (and harmful soil compaction) are avoided (→Article 13 (2) SCP)?

- ▶ Out of 25 respondents, 18 (70%) stated that they are aware of regions in which the forests are used and maintained in accordance with **Article 13 (2) SCP**, while 7 respondents (30%) answered this question in the negative.
- ▶ 18 respondents listed the following silvicultural measures pursuant to **Article 13 (2) SCP**:

Measures regarding the use and maintenance of forests (Article 13 (2) SCP)	No. of mentions
Site-appropriate forestry	16
Site-appropriate tree species makes	14
Natural forest rejuvenation	10
Afforestation of areas at risk	10
Soil-protecting forest management	9
Enhancement of diversity in the forest ecosystem	8
Adapting game population sizes to the forest ecosystem	8
Site-appropriate road construction	7
Maintaining historical forms of management	2
Forests in themselves are form of erosion control	1
Continuous cover forestry including earthworm-friendly and pollinator-friendly trees as well as energy forests	1
National legislation prevents clear felling (Slovenia)	1

14

respondents listed the following regions and examples of silvicultural measures pursuant to **Article 13 (2) SCP**:

- i: x If so (Yes)
- ii: x If so (Yes)

Regions and examples of the use and maintenance of forests pursuant to Article 13 (2) SCP		i	ii
Slovenia	Forest use and maintenance based on natural principles is practised nationwide	x	x
Tyrol	The State Forestry Directorate is highly active in terms of optimum site assessments and adapted forest management as well as in terms of communicating this to forest owners.	x	x
Salzburg	Alpine region	x	x
Bavaria	Afforestation of slopes in the Alpine foothills (e.g. Herzogstand) with the aim of avoiding soil erosion and preventing avalanches	x	x
Bavaria, Fürstenfeldbruck District	“Sustainable adaptation with the power of nature” strategy; biodiversity award	x	
Lower Austria	Measures are implemented pursuant to the Austrian AEM (ÖPUL)	x	
Carinthia	Vellacher Kotschna (high-level valley in the Kamnik Alps): specific management plans in Natura 2000 sites	x	
Upper Styria	-	x	

- Out of 17 respondents, 10 (60%) did not consider there to be a **causal and substantive link** to **Article 13 (2) SCP** as these practices had historically “always” been practised, while 7 respondents (40%) did see a connection which they described as follows:

Description of the potential causal and substantive connection to Article 13 (2) SCP:	
Tyrol	SCP is an important background; Tyrolean Forestry Act contains many provisions with regard to the maintenance of forest functions.
	There is a substantive connection where it comes to the protection of settlements from risks associated with erosion as well as from other natural hazards (e.g. avalanches).
Styria	SCP fosters greater awareness, improved education and training, greater understanding
Salzburg	Protective forest restoration projects were focused on fixing damage after the fact, often caused by excess game populations, without making effective attempts at eliminating the root causes. In order to create adequate conditions for forest self-rejuvenation and thus to safeguard the forests’ protective function, it would be worth considering to engage in prophylactic game management and a sustainable design of hunting as a form of land-use, and close cooperation with forest management planning. The Mountain Forests Protocol, Article 6(1) of which is indeed identical in its wording to Article 13(2) of the Soil Conservation Protocol, should also be taken into account, not least in order to promote the integrative perspective called for in the Alpine Convention.
Southern Tyrol	presumably yes...

Question 15: Due to their specific characteristics, soils differ in their vulnerability to erosion. Are you aware of regions in which sufficient methodological foundations are available that would allow for assessments of the soils’ vulnerability to erosion (→ Article 1 (3) SCP, Article 11 SCP)?

- Out of 27 respondents, for (20%) stated that they are aware of **regions** in which methodological foundations pursuant to **Article 1 (3) SCP** and **Article 11 SCP** are available, while 5 respondents (20%) answered the question in the negative, 9 respondents (35%)

acknowledged partial availability, and 7 respondents (25%) were unable to assess the situation.

- ▶ 14 respondents named the following **methodological foundations** for the assessment of the vulnerability of soils to erosion pursuant to **Article 1 (3) SCP** and **Article 11 SCP**:

Methodological foundations for the assessment of the vulnerability of soils to erosion (Article 1 (3) SCP and Article 11 SCP)	No. of mentions
Risk maps	10
Depiction in the land registry	6
Training, info flyer, work aids	5
Assessment module, e.g. in the form of web-based GIS application	3
Soil science knowledge, soil maps	1
"Living soils" with functioning organic matter	1

- ▶ 8 respondents listed the following regions and examples with regard to the availability of methodological foundations pursuant to Article 1 (3) SCP and Article 11 SCP:

- (Art. 1 (3) Soil protocol, Art. 11 Soil protocol) Do you know regions where adequate methods exist for the assessment of soil erosion risk?
i: x If so (Yes)
- Have you recognized a causative context with the soil protocol?
ii: x If so (Yes)

Regions and examples of the availability of methodological foundations		i	ii
Austria	For vulnerable regions in every federal state, but at a very small scale (1:25,000). Detailed maps are urgently needed.	x	x
	Baseline information held by the Federal Agency for Water Management		
Vorarlberg	Leiblach valley: as a component of the energy plan for the region as part of the recharge.green EU project		
Bavaria	Bavarian Ministry of Food, Agriculture and Forestry's erosion risk land registry		
	Lake catchment		
Baden-Württemberg	All loess regions		
Italy	Aosta valley		

- ▶ 15 respondents named as desirable the following assessment foundations for the assessment of the vulnerability of soils to erosion pursuant to **Article 1 (3) SCP** and **Article 11 SCP**:

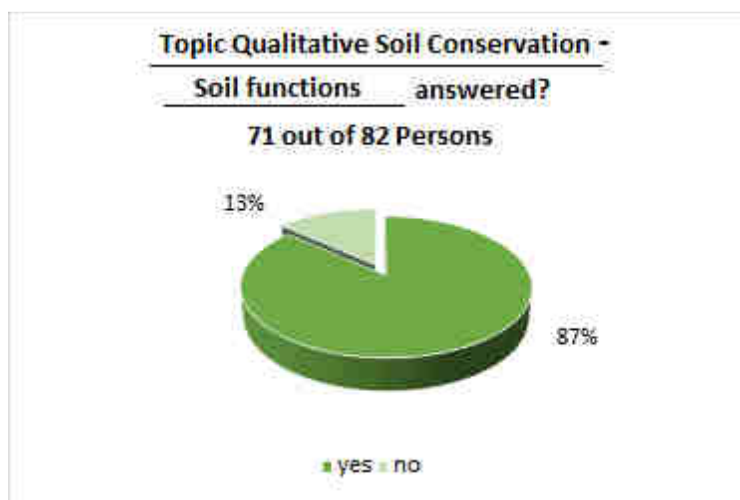
if no, what kind of methodological foundations for the assessment of the vulnerability of soils to erosion pursuant to Article 1 (3) SCP and Article 11 SCP would be desirable	No. of mentions
Risk maps	13
Training, info flyer, work aids	8
Depiction in the land registry	8
Assessment module, e.g. in the form of web-based GIS	7
Other soil assessments, site mapping	2

b) Qualitative soil conservation and soil functions

The Alpine soil protocol explicitly mentions the need to safeguard and preserve the ecological functions of soils as one of its objectives (⇒ *Article 1 (2) SCP*). The soil as an ecosystem performs a multitude of services: Among many other functions, soils provide, for example, habitat for soil organisms, potential sites for natural plant communities, water discharge regulation, natural soil fertility, a filter and buffer for pollutants, and they contribute to groundwater discharge, reduce thermal amplitudes and sequester carbon.

In the areas of water management (flood protection, drinking water protection, reduction of thermal amplitudes) and carbon sequestration (organic matter content) soil functions are immediately evident.

The segment on “Qualitative soil conservation and soil functions” was completed by 71 respondents (71 of 82 = 87%).



Question 16: Does the issue of soil functions (⇒ *Article 1 (2) SCP*) play a role in your daily work?

- ▶ Out of 48 respondents, 46 (96%) stated that the **issue of soil functions plays a role** in their daily work, while one person each (2%) answered the question in the negative or was unable to make a statement in the matter respectively.
- ▶ 46 respondents named the **following soil functions** as playing a role in their daily work:

Soil functions that play a role in the respondents' daily work	No. of mentions
Filter and buffer for pollutants	39
Discharge regulation for water resulting from heavy rainfall events	33
Potential sites for natural plant communities	32
Natural soil fertility (soil production potential)	32
Habitat for soil organisms	27
Contribution to groundwater discharge	22
Carbon sequestration	21
Reduction of thermal amplitudes	10

Function as an archive of natural and cultural heritage	1
Crop rotation sites	1
Recreational value	1

Question 17: Are you aware of regions in which concrete measures were taken or are being taken to qualitatively and quantitatively safeguard ecological soil functions in the long-term (→ Article 1 (3) SCP)?

- ▶ Out of 47 respondents, 23 (49%) stated that they are **aware of regions** in **ecological soil functions** pursuant to **Article 1 (3) SCP** have been qualitatively and quantitatively safeguarded in the long-term pursuant (**Article 1 (3) SCP**), while 24 respondents (51%) answered the question in the negative.
- ▶ 22 respondents named the following regions, soil functions and concrete measures taken to qualitatively and quantitatively safeguard ecological soil functions in the long-term (**Article 1 (3) SCP**):

Regions, soil functions and concrete measures taken to qualitatively and quantitatively safeguard ecological soil functions in the long-term (Article 1 (3) SCP)	Austria	Tyrol	Salzburg	Lower Austria	Upper Austria	Switzerland	Southern Tyrol	Germany	Bavaria	No. of mentions
The assessment of soil functions (all soil functions mentioned above) is a mandatory component of the planning process; planning takes this assessment in consideration and soil conservation measures are set out; embedded in the Salzburg Soil Conservation Act; local spatial development strategies (REK) pursuant to Salzburg Spatial Planning Act 2009 (ROG)			x							7
Synergies with Nature Conservation Act (site function – peatland, freshwater marshes, spring vegetation, wet grassland, xeric and nutrient-poor sites etc.)			x							1
Various projects (land reform, agri-structural development planning for Stetteldorf am Wagram, project on humus balancing)				x						1
Assessment of soil functions is made available free of charge (all soil functions mentioned above), manual on assessment of soil functions					x					1
Various protection areas (<i>Schutzgebiet</i> /inner protection zone, <i>Schongebiet</i> /outer protection zone), special programs for ski resorts	x									1
Forestry Act	x									1
Abstention from building developments and road construction projects as a result of citizen decisions									x	1
Requirements for precautions in source water protection areas (4-5% of the state's territory)									x	1
Agri-environmental measures									x	1
Alpine region: carbon sink, filter and buffer for pollutants, discharge regulation, groundwater recharge, peatland restoration									x	1
Ebersberg District/Glonn: Hermannsdorfer Landwerkstätten (organic farming project)									x	1
Fürstenfeldbruck District/Markt Kaufering: "Sustainable adaptation with the power of nature" strategy; biodiversity award									x	1

Towns/cities in the Ruhr region								x		1
Consistent supervision of construction projects with a view to soil conservation results in tangible measures during construction						x				1
Restoration of previously polluted sites							x			1
Nature Parks/National Parks (indirect protection of soil functions)						x				1

- Out of 24 respondents, 16 (67%) did not consider there to be a causal and substantive link with **Article 1(3) SCP** as these measures were implemented independently from the SCP, while 8 respondents (33%) considered there to be a link which they described as follows:

- x If so and number of entries

Description of a possible causative context with the soil protocol Art 11.

Description of the potential causal and substantive connection to Article 11		i
Salzburg	In addition to the Salzburg Soil Conservation Act, the Alpine Convention formed an essential “legal” basis for conducting the assessment of soil functions; SCP was an important legal basis for the provision of soil function assessment data and for requesting these as part of public law processes in relation to plans and projects; embedding in the Salzburg Soil Conservation Act – however, as a result of the period during which the Act was developed it strongly dovetails with the SCP.	6
Tyrol	More of a legal “backing” for a few persons who are “soil aware” anyway.	1
Southern Tyrol	The aim was to safeguard soil functions	1

Question 18: Is the objective of preserving “the ecological function of soil”, as explicitly stated in Article 1(2) SCP, an objective of other legal provisions governing national soil planning?

- Out of 44 respondents, 21 (48%) stated that in their country of origin, the objective of preserving “the ecological function of soil”, as explicitly stated in **Article 1(2) SCP**, is an objective of other legal provisions governing national soil planning, while 8 respondents (18%) answered the question in the negative and 15 respondents (34%) were unable to make a statement on the matter.
- 23 respondents listed the following legal provisions:

Other legal provisions governing national soil planning that contain the objective of preserving “the ecological function of soil”, as explicitly stated in Article 1(2) SCP :	Austria	Tyrol	Salzburg	Lower Austria	Upper Austria	Steiermark	Switzerland	Germany	No. of mentions
SoilPO: Ordinance of 1 July 1998 on the Pollution of Soil (Soil Pollution Ordinance); threshold values contained in the annexes to the SoilPO: https://www.admin.ch/opc/it/classified-compilation/19981783/index.html ; Article 2 SoilPO; the objective is to preserve soil fertility, which entails the preservation of ecological soil functions							x		4
Soil Protection Act (BodSchG) of the federal state of Salzburg 2001; is not applicable to soils under silvicultural use			x						4

Soil Protection Act (BodSchG) of the Federal state of Upper Austria 1993					x					4
Environmental Protection Act (USG): Federal Act on environmental protection; the objective is to preserve soil fertility, which entails the preservation of ecological soil functions										2
Spatial Planning Act (ROG) 2009			x							1
Salzburg Nature Conservation Act: indirect protection by way of preserving and sustainably safeguarding natural or cultural habitats			x							1
Strategic Environmental Protection (SUP) Ordinance: Environmental assessment ordinance for spatial planning plans and programmes (2010)			x							1
Upper Austria: Regional spatial planning programme for Eferding					x					1
Upper Austria: Regional spatial planning programme for the Linz hinterland 2					x					1
Steiermark: various provisions regarding good agricultural practice						x				1
Contained in part in the federal states' spatial planning acts	x									
At the level of the federal states in State Soil Conservation Acts insofar as these exist; not all of the federal states have enacted Soil Conservation Acts	x									
German Federal Soil Protection Act (BBodSchG 1998)									x	
In part, indirectly through Section 202 of the Federal Building Code (BauGB): Protection of topsoil									x	
Federal Nature Conservation Act (BNatSchG, 1977, 1998, 2009)									x	
National Soil Strategy (under development)							x			

Question 19: Given their specific characteristics, soils differ in their functional capacities. Are you aware of regions in which sufficient methodological foundations are available that would allow for assessments and depictions of positive/negative impacts on the soils' functional capacities (→ Preamble SCP, Article 1 (3) SCP, Article 8 (2) SCP)?

- ▶ Out of 39 respondents, 16 (37%) stated that they are aware of **regions** in which sufficient methodological foundations are available that would allow for assessments and depictions of positive/negative impacts on the soils' functional capacities (**Preamble SCP, Article 1 (3) SCP, Article 8 (2) SCP**), while 17 respondents (40%) answered this question in the negative and 10 respondents (23%) were unable to make a statement on the matter.
 - ▶ 24 respondents listed the following **regions and examples** with regard to the availability of **methodological foundations** for the assessment of soil functions (**Preamble SCP, Article 1 (3) SCP, Article 8 (2) SCP**):
 - x If so and number of entries
- Regions and examples for existing methods to assess soil functions (preamble, Art 1 (3), Art 8 (2) Soil protocol)

Regions and examples with regard to the availability of methodological foundations for the assessment of soil functions (Preamble SCP, Article 1 (3) SCP and Article 8 (2) SCP)		i
Soil function maps		
Salzburg	Soil function maps: ÖNORM L 1076 for 5 soil functions	9
Bavaria	Soil function maps: Bavarian Environment Agency 1:25,000; Bavarian soil information system (<i>BIS Bayern</i>), Bavarian soil mapping scheme, different regions in Bavaria, assessment of soil functions based on overview soil maps; by autumn	5

	2015: Scheyern Experimental Station as a research field of the Helmholtz Association Munich	
Upper Austria	Soil function assessment maps, full coverage	3
Training, info flyer, work aids		
Salzburg	Planners can access trainings in this field; guidance on soil protection in the context of planned developments; interpretation manual on soil function assessment " <i>Das Schutzgut Boden im SAGISonline</i> "	5
Bavaria	Work aid/guidance on soil as a conservation asset in the planning process (" <i>Schutzgut Boden in der Planung</i> ", Bavarian Geological Agency & Bavarian Environment Agency 2003); Fuchstal living forests soils nature trail	5
Upper Austria	Training for municipalities in the use of soil function maps and Upper Austria; manual on soil function assessment in Upper Austria	3
Assessment modules, e.g. in the form of web-based GIS applications		
Salzburg	<u>Foundations</u> : land valuation results, local soil assessment, financial land valuation; Guidance on soil protection in the context of planned developments in Salzburg; results available in SAGISonline	2
Upper Austria	Federal state homepage / environment / soils	2
Austria	Initial approaches as part of the online digital soil maps for Austria (<i>eBOD Österreich</i>) / ÖNORM L 1076	
Bavaria	Bavarian soil information system (<i>BIS Bayern</i>)	2
Depiction in the land registry		
Salzburg	https://www.salzburg.gv.at/themen/bauen-wohnen/raumplanung/geodaten/sagisonline-themeneinstiege	6
Upper Austria	https://www.land-oberoesterreich.gv.at/127380.htm	1
Other methodological foundations		
Salzburg	Habitat mapping	1
Switzerland	Local mapping can be used, as required, to establish the soils' functional capacity	1

- 19 respondents listed as desirable the following methodological foundations for the assessment of soil functions (Preamble SCP, Article 1 (3) SCP, Article 8 (2) SCP):

Methodological foundations for the assessment of soil functions (Preamble SCP, Article 1 (3) SCP, Article 8 (2) SCP)	No. of mentions
Soil function maps	14
Assessment modules, e.g. in the form of a WebGIS application	11
Training, info flyer, working aid	10
Depiction in the land registry	8
Soil map as baseline information	1

Nine of the respondents elaborated on their answers as follows:

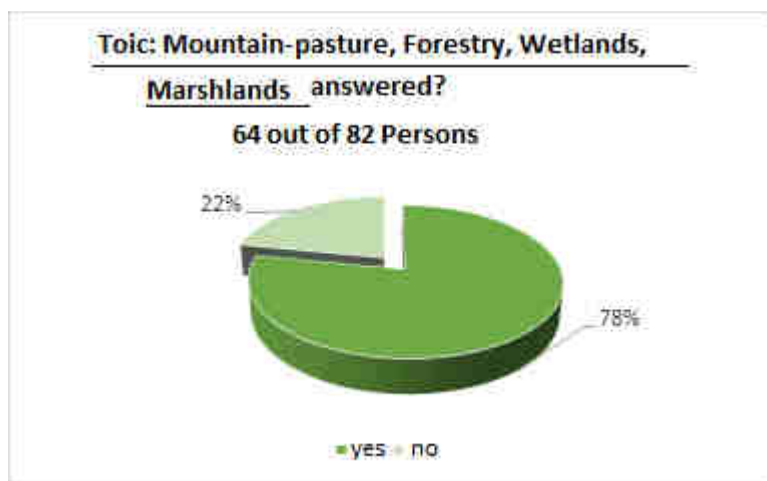
Desirable methodological foundations for the assessment of soil functions (Preamble SCP, Article 1 (3) SCP, Article 8 (2) SCP)		Austria	Tyrol	Salzburg	Slovenia	Switzerland	Southern Tyrol	Bavaria	Region not known
Desirable methodological foundations	Expanded answer								
	Soil function maps are a good baseline for planning		x						
	Soil surveys and assessments including soil functions are often rather superficially conducted by the regional planning consultancies.							x	

Soil function maps	Only very few consultancies specialised on soils conduct a comprehensive assessment of soils as conservation assets.							x	
	There should be easy access to the maps.	x							
	It would be desirable to have these [maps] for all of Austria and the entire Alpine region.		x						
	Soil function assessment as a basis for decision-making in cases of land-use change or spatial planning decisions	x							
Assessment modules, e.g. in the form of a WebGIS application	Assessment modules are useful (only) for experts with a sufficient understanding of soils		x						
Training, info flyer, working aid	Trainings are necessary as the soil is a largely unknown component in nature conservation.		x						
Depiction in the land registry	The depiction of assessment fundamentals in the land registry or access to WebGIS applications allows for swift information retrieval.				x		x		
Soil map as baseline information	Without soil maps at a detailed scale it is not possible to conduct a functional assessment			x					
A vote for habitat mapping	Habitat maps are available for the entire country and for each individually mapped area these contain site data (including the identification of the major soil type) and an assessment of the risk potential.								x

c) Farming, forestry, wetlands and moors in mountain regions

The Alpine Convention strives to maintain and support environmentally sound practices in mountain farming, which are adapted to suit local conditions (Article 12). This includes the maintenance of settlements in remote and rural areas as well as sustainable management, especially by fostering the production of quality products typical of the area. The natural environment is to be maintained (with special protection granted to wetlands and moors (Article 9)), the usage of substances (pesticides, fertilisers) is to be minimised, and preventive measures are to be taken to protect from natural hazards. Moreover, the aim is to safeguard the landscape's aesthetic qualities as well as the recreational value of nature, landscape and cultural life and to strive towards solidarity and responsibility within the population and the municipalities. Mountain forestry (Article 13) aims to maintain mountain forests as near natural habitats and, if necessary, to engage in reforestation efforts or to expand existing forests and improve their stability. This is achieved by a mountain forest system that is sustainably managed in harmony with nature.

The questionnaire's segment on agriculture, forestry, wetlands and moors in mountain regions was completed by 64 respondents (64 of 82 = 78%)

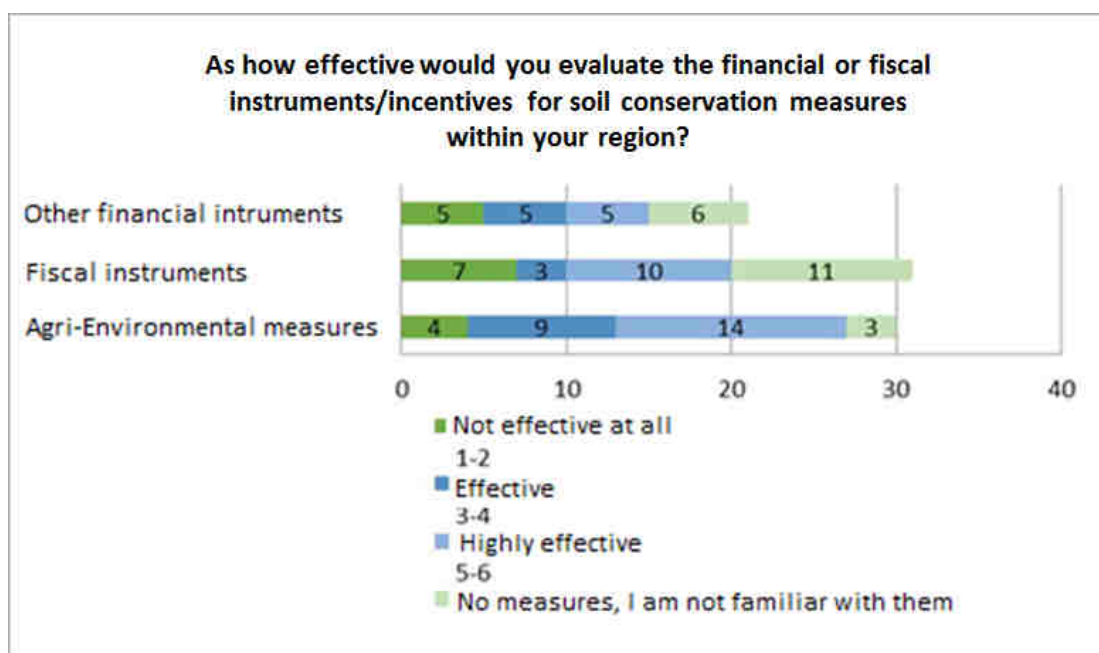


Question 20. In your opinion, how effective are financial or fiscal/incentives for soil protection measures in your region, e.g. particularly soil-protecting silvicultural or agricultural practices supported as part of agri-environmental schemes? (→Article 2 (3) SCP)

Question 20 (around the issue of farming) was completed by 32 respondents (32 of 82 = 39%).

Soil-protecting practices are supported in all EU countries under the CAP (cross-compliance). The individual member states are however granted a certain amount of scope in their ultimate design of the guidelines. The aim of this question was to get an assessment from individuals in charge of policy and administration in this field as to whether the above-mentioned schemes have fully unfolded their intended steering effect.

Survey result



As other measures, respondents listed the following:

- ▶ Regulatory law
- ▶ Ring-fencing of parts of the tourism levy for landscape management measures to be undertaken by farmers
- ▶ Support for measures to improve/maintain protective forests.

Brief interpretation of the result

The majority of respondents (29 out of 32 replies) confirmed the desired steering effect and high effectiveness (factors 5 & 6) of fiscal, other or agri-environmental measures with respect to fostering soil protecting management (the most frequently named programmes are the Austrian agri-environmental programme ÖPUL, the cultural landscape programmes KULAP, and the Swiss “proof of ecological performance” ÖLN).

However, the comments (18 out of 64 statements) also include statements to the effect that subsidy-driven measures tend to be counter-productive, with fiscal incentives and support measures for the construction of access roadways in forests and alpine pastures, the construction of roads for municipalities and districts, business taxes, and exclusion criteria for zoning (in preparatory land-use plans) being mentioned as being of concern, among others.

Programmes /measures mentioned	Number of mentions
ÖLN (Swiss “proof of ecological performance” required to receive public subsidies)	2
KULAP (cultural landscape programmes)	3
ÖPUL (Austrian agri-environmental programme)	9
EAFRD 2014-2020	1
Landscape management premia and environmental premia in accordance with state laws	1
To date, fiscal incentives and support measures have supported the destruction of soils, e.g. through subsidies for municipal road construction, the construction of access roads in forests and alpine pastures, business tax.	1
Counter-productive: support for forestry roads and lack of “no-go areas” in zoning.	1

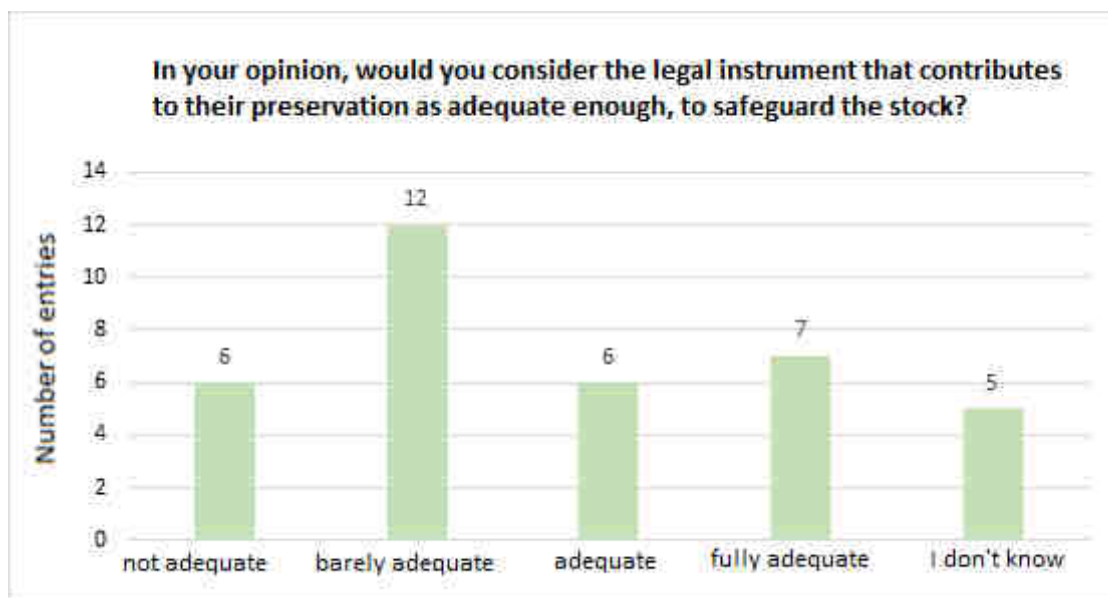
Question 21. Article 9 SCP endeavours to protect soils in wetlands and moors. In your opinion, is the suite of legal instruments that can be used for their protection sufficient to safeguard the existing stock?

Question 21 (around the issue of farming) was answered by 36 respondents (36 of 82 = 44%).

Under Article 9 of the Soil Conservation Protocol, moors, wetlands and wetland habitats are granted protection additional to that granted by conservation legislation (internationally under the Ramsar

Convention, EU-wide under the Habitats Directive, and under the various countries' conservation laws at the regional or national level). The SCP and the conservation legislation cover different aspects in that conservation laws protect the aquatic or water-inundated habitats while the SCP is concerned with soil-relevant aspects (major soil type). Protection solely under the Soil Conservation Protocol would not be sufficient to address all issues.

Specifically, respondents made the following statements:



Brief interpretation of the result

The majority of respondents does not regard as sufficient the protection afforded to moors and wetlands by the Soil Conservation Protocol (18 mentions), while 13 respondents consider the level of protection to be sufficient. In other words, there is no consensus here.

The sub-question aimed at elucidating the factors that prompted respondents to submit “insufficient” as their response:

Excessively strong federalism and vested interests
A federal matter, municipal interests, profit-orientation of companies, vested interests
Unfortunately, more often than not other economic interests are valued more highly.
The problem is that this provision, which is directly applicable in Austria, is often incorrectly applied by the authorities.
Upper Austrian Spatial Planning Act and Upper Austrian Soil Protection Act
The Soil Conservation Protocol by itself would be insufficient, but the State Conservation Act guarantees the protection of wetland habitats and moors.

Despite the fact that moors are considered to be of the highest conservation concern, they continue to be disturbed or destroyed as a result of ski infrastructure developments, zoning and technical developments with regard to forest access. Austria is lacking <i>de jure</i> moor protection.
Exemptions for agricultural management are too wide-ranging and the administrations' monitoring capacities are insufficient.
In Austria, Article 9 SCP is normally interpreted to afford protection only to intact moors the protection of which is however rarely under dispute (conservation legislation etc.). Extensive areas of moor soils under agricultural land-use (especially drained fens) are not normally referenced as falling under and warranting protection under Article 9 SCP .
National soil protection legislation does not provide for comprehensive moor protection; if the climate protection function of soils was to be more firmly embedded in the German Federal Soil Protection Act (BBodSchG) this would offer potential legal tools.
legal instruments should rely on better information on soils but information on soils mainly remains unsatisfactory - not enough directly applicable information soil maps not available in required scale (large scale maps are needed) soil classification used in soil maps are not interpretative enough - should be improved to become a basis for legal instruments
Wetlands and moors are protected under Environmental Laws (therefore soils are de facto protected). On the contrary, organic soils under agricultural use are not protected, are currently degrading (legal instruments not sufficient)

Brief interpretation of the result

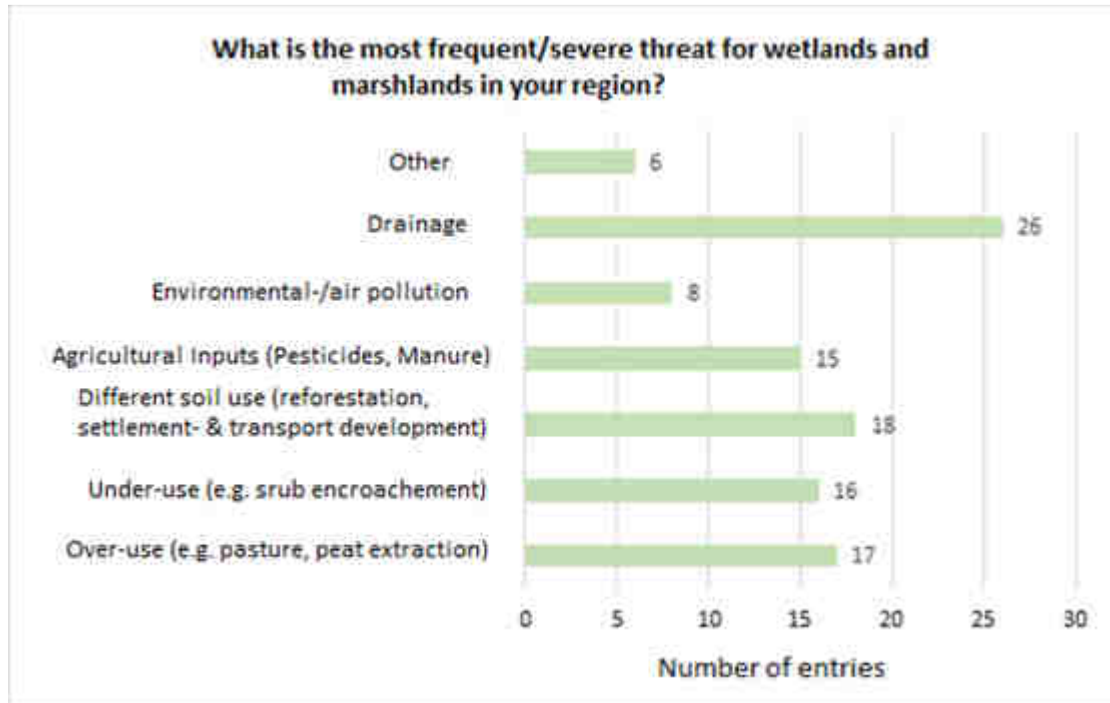
In some of the Alpine countries, the legal framework for the protection of moors and wetlands is considered to be sufficient; the implementation of these legal provisions however is deemed to be unsatisfactory. Exemptions are frequently granted, mostly in favour of infrastructure developments (skiing, housing developments, other singular interests) or out of ignorance on the part of the authorities granting permits. The inclusion of climate protection into the SCP's objectives is being proposed.

In other countries, the Soil Conservation Protocol does not provide for the protection of moors and wetlands, in part due to missing baseline information and/or instruments. In particular, this affects fen soils under agricultural land-use.

Question 22. What are the most frequent adverse impacts on / risks to wetlands and moors in your region? (multiple responses allowed)

Question 22 (around the issue of farming) was answered by 36 respondents (36 out of 82 = 44%).

Despite the fact that the conservation of moors and wetlands is a clear international, European and national policy objective, other interests frequently override their protection. The following table lists the most frequent drivers of adverse impacts on or the destruction of such habitats:



“Other” impacts were specified as follows:

- Golf course developments
- Access development for ski tourism, zoning, extraction (mineral resources)
- Agricultural conversion of grassland to arable land (e.g. as a result of an increase of maize cultivation for energy generation)
- Nitrogen airborne inputs leading to eutrophication (change in plant communities attested; in microbial communities certain even if not attested)

Brief interpretation of the result

The answers the answers provided by the respondents show that the most frequent drivers of adverse impacts or the destruction of moors and wetlands tend to be over-utilisation or changes in land-use (50 mentions). Moors and wetlands are also very frequently drained (26 mentions). While in cases of under-utilisation, resulting for example in scrub encroachment (16 mentions), the habitat will undergo changes, this does not generally tend to critically impair the soils themselves.

Moors and wetlands are primarily afforded protection under conservation legislation. Soil-relevant factors tend to be a secondary concern or are not given sufficient consideration in assessments (e.g. in the case of eutrophication or drainage and resultant changes in soil quality).

Question 23. Have there been any particularly critical cases (precedents) in your sphere of work of practices in arable farming, forestry or pasture management that

have resulted in adverse impacts on soils? Where applicable, please also state the undesirable impact on the soil. (Articles 12 and 13 SCP)

Question 23 (around the issue of farming) was completed by 9 respondents (9 out of 82 = 11%).

The aim of Question 23 is to explore adverse impacts on soils resulting from agricultural or forestry practices in greater detail and to specify examples of adverse impacts of this kind. The lists below show that the examples given are very diverse in their nature and affect many different areas of land-use management. Many of the responses given do not only list the adverse impacts on soils but also the drivers of these impacts.

The following impacts are often observed in the areas of agricultural land-use/tillage farming:

- ▶ Ploughing up of grassland resulting in greenhouse gas emissions, biodiversity loss, water discharge, erosion;
- ▶ Intensification of grassland management (number of cuts, fertiliser use...) and tillage farming in marshy areas resulting in loss of biodiversity;
- ▶ Drainage works resulting in drainage of wetlands and moors;
- ▶ Tillage farming as well as inappropriate/unsustainable soil cultivation resulting in susceptibility to erosion as well as the loss of organic matter.

The following impacts are very frequently found in Alpine areas under pasture management:

- ▶ Poaching by grazers resulting in the development of stagnosols;
- ▶ Destruction/severe degradation of fen habitats in Alpine pasture areas as a result of overly high stocking rates;
- ▶ Overgrazing resulting in soil compaction;
- ▶ Lack of buffer zones between wetlands/moors and intensively used lands;
- ▶ "Fertiliser effect" as a result of the deposition of atmospheric N-emissions;
- ▶ Overgrazing (poaching, eutrophication);
- ▶ Abandonment of extensively managed grassland (scrub encroachment);
- ▶ Afforestation of marshland (loss of habitat acreage);
- ▶ Slurry management (nutrient deposition, raised nutrient status)

Very frequently observed impacts in the area of forestry management include:

- ▶ Intensification of forestry management, including the construction of access roads in previously extensively utilised areas of montane forests;
- ▶ Heavy harvesters used on soils very sensitive to soil compaction; building of forest roads not careful enough
- ▶ Construction of transport routes, second homes, transport development, or tourism developments, resulting in the sealing of surfaces
- ▶ Construction of snow ponds or golf courses in Alpine moor sites, construction of forest access roads and ski slopes resulting in the loss of small-scale structures and habitat acreage.

Brief interpretation of the result

The most frequently mentioned adverse impacts on soils in moors and wetlands include the ploughing up of grassland, eutrophication, drainage, compaction, surface sealing and land consumption. A quantitative assessment of the drivers of these impacts goes beyond this current questionnaire; the authors refer to the copious body of literature on the various topics, including for example the German "Grünlandbericht" (grassland report) published in 2015.

It appears that soils in moors and wetlands are considered to be of secondary conservation concern. Moreover, fen soils are not afforded sufficient protection. Climate-relevant aspects are set not taken into consideration in the assessment of soils as conservation assets.

Question 24. Article 12 (2) and (3) SCP provide for soil conservation as a result of sound practices in tillage farming, pasture management and forestry which are adapted to suit local conditions, and by minimising inputs of substances. Which definition of good agricultural practice are you aware of/do you apply?

Question 24 was completed by 20 respondents (20 out of 82 = 24%).

The term “Good Agricultural Practice (GAP)” is used to describe congruence between current management and “Best Available Technique (BAT)”, normally also taking into consideration environmental requirements under cross-compliance rules. However, the benchmark for this approach is conventional (*sensu* non-organic) agricultural management. Additionally, a number of accepted definitions were listed by the respondents, including the FAO (Rome) definition:

“GAP is the application of available knowledge to address environmental, economic and social sustainability for on-production and post-production process resulting in production of safe and healthy food and non-food agricultural products.” (FAO, 2016)

The German Federal Soil Protection Act (BBodSchG) contains a further definition:

Article 17(2) BBodSchG:

“The principles of good practice in agricultural soil use are the permanent protection of the soil’s fertility and of the soil’s functional capacity as a natural resource. In particular, the principles of good agricultural practice include:

1. in general, the soil shall be worked in a manner that is appropriate for the relevant site, taking weather conditions into account,
2. the soil structure shall be conserved or improved,
3. soil compaction shall be avoided as far as possible, especially by taking the relevant soil type and soil humidity into account, and by controlling the pressure exerted on the soil by equipment used for agricultural soil use,
4. soil erosion shall be avoided wherever possible, by means of site-adapted use, especially use that takes slope, water and wind conditions and the soil cover into account,
5. the predominantly natural structural elements of field parcels that are needed for soil conservation, especially hedges, field shrubbery and trees, field boundaries and terracing, shall be preserved,
6. the soil’s biological activity shall be conserved or promoted by means of appropriate crop rotation and
7. the soil’s humus content, as is typical for the site in question, shall be conserved, especially by means of adequate input of organic substances or of reduction of the intensity with which the soil is worked.”

With regard to the term “Good Agricultural Practice”, respondents additionally stated the following:

The term would not appear to be very expedient as it is hardly possible to come up with a useful definition. The Chamber of Agriculture is a very powerful stakeholder (also in discourse) with insufficient interest in nature conservation and it will always co-opt the term to their own benefit.
The current definition used in the various cannot guarantee soil throughout the state.
GAP in soil cultivation, GAP pursuant to Fertiliser Ordinance
Pursuant to Article 17 BBodSchV (German Federal Soil Conservation and Contaminated Site Ordinance)
Austrian agri-environmental programme ÖPUL (2 mentions)
Is known and is being applied
EU Nitrates Directive Cross-compliance
Utilising issued by the Advisory Committee on Soil Fertility and Soil Protection at the Austrian Federal Ministry for Agriculture, Forestry, the Environment and Water Management (<i>Fachbeirat für Bodenfruchtbarkeit und Bodenschutz des BMLFUW</i>) (3 mentions)
Continuous cover forests containing large earthworm populations and functional humus
Nitrates Action Programme Standard local management practices
Near-natural forestry management, continuous cover forestry
Almost anything is permitted under the commonplace legal definitions of “contemporary farming and forestry”
Don’t know any specific definition
Good agricultural practice has been incorporated into the Salzburg Soil Protection Act
Article 12 is well written [no further amendments needed]
As regards 12(2) and (3) several guidelines have been prepared on the national level: A code on good agricultural practice has been prepared for preservation of water, soil, air and biological diversity in 2006, a guideline for expert grounded manuring and use of fertilizers in 2010.

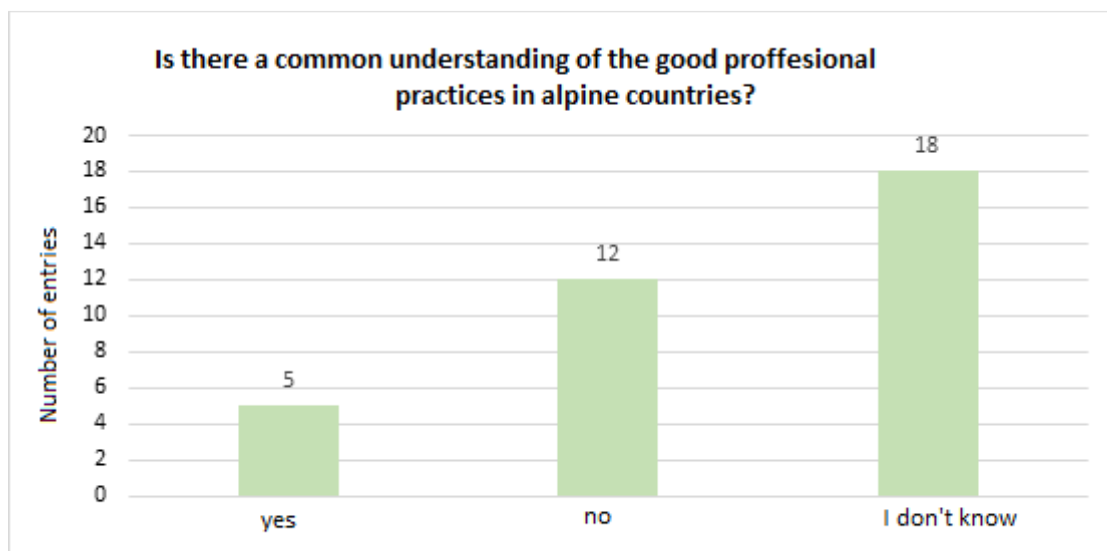
Brief interpretation of the result

The understanding of what constitutes good agricultural practice differs between the individual Alpine countries and draws on different technical bases (Nitrates Directive, cross-compliance, near-natural forestry management etc.). Moreover, the interpretation of what is considered to be good agricultural practice is relative and depends on the institution that issues the definition. Aspects of soil conservation and not considered as a matter of course or in full.

Question 24.1. Is there a common understanding in the Alpine countries of what constitutes good agricultural practice?

Question 24.1 was answered by 35 respondents (35 out of 82 = 43%).

A common understanding of what constitutes good agricultural practice would be of major importance to the implementation of soil protection measures, given that agriculture and forestry have a significant impact on soil quality. However, it appears that opinions in this regard vary greatly and reference is made to familiarity with agricultural practice that is “at least not damaging”.

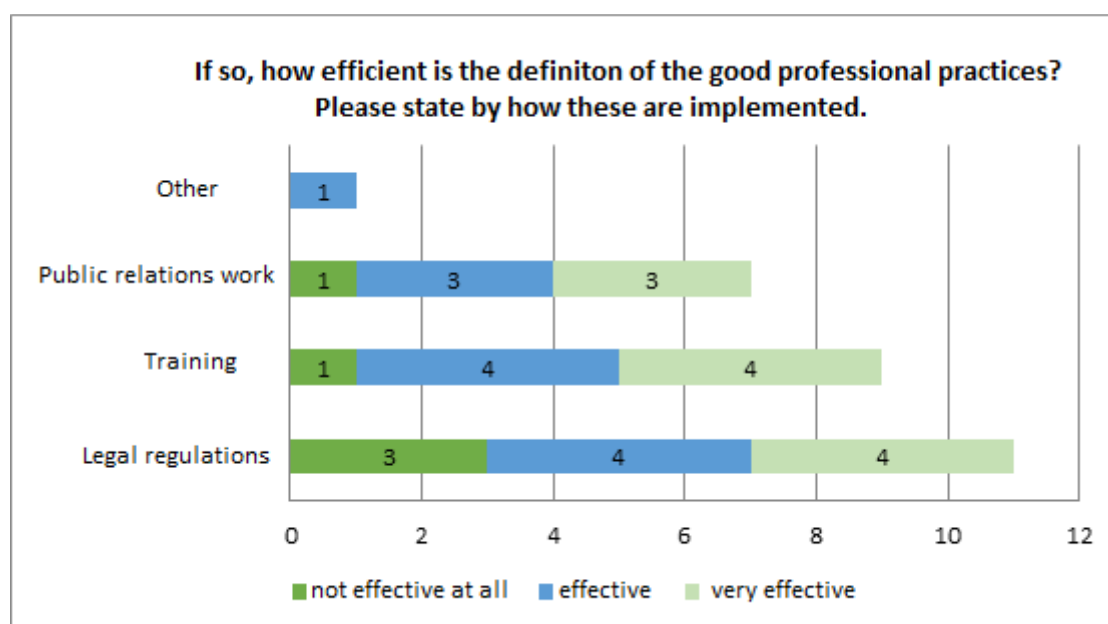


Question 24.2. If yes, how effective is the definition of good agricultural practice? Please state how this is implemented?

Question 24.2 was completed by 11 respondents (11 out of 82 = 12%).

Question 24.2 asks more specifically how the term “good agricultural practice” is communicated and conveyed to the different target groups.

Survey result



Supplementary information on statutory instruments:

- ▶ Fertiliser Ordinance
- ▶ Sheet erosion: procedure pursuant to Article 8 BBodSchV (German Federal Soil Conservation and Contaminated Site Ordinance)
- ▶ Chamber [?]
- ▶ Primarily through agri-environmental programmes and cross-compliance
- ▶ Article 17 BBodSchG (German Federal Soil Protection Act)
- ▶ Soil Protection Act, Sewage Sludge Ordinance
- ▶ Salzburg Soil Protection Act

Supplementary information on the issue of "Training"

- ▶ Training and advanced training for farmers
- ▶ Agricultural colleges
- ▶ Good examples (3 mentions)
- ▶ Austrian agri-environmental programme ÖPUL, extension advice on soil protection, farm field days
- ▶ Extension advice on soil protection (e.g. by demonstrating good examples)

Supplementary information on the issue of "PR work"

- ▶ Brochure published by AID info service on good agricultural practice in soil management
- ▶ Media
- ▶ Information services, voluntary associations
- ▶ Voluntary associations and private individuals
- ▶ Articles in farmers' journal, presentations in schools
- ▶ Training seminars, articles, advisory services (media, voluntary associations)

Brief interpretation of the result

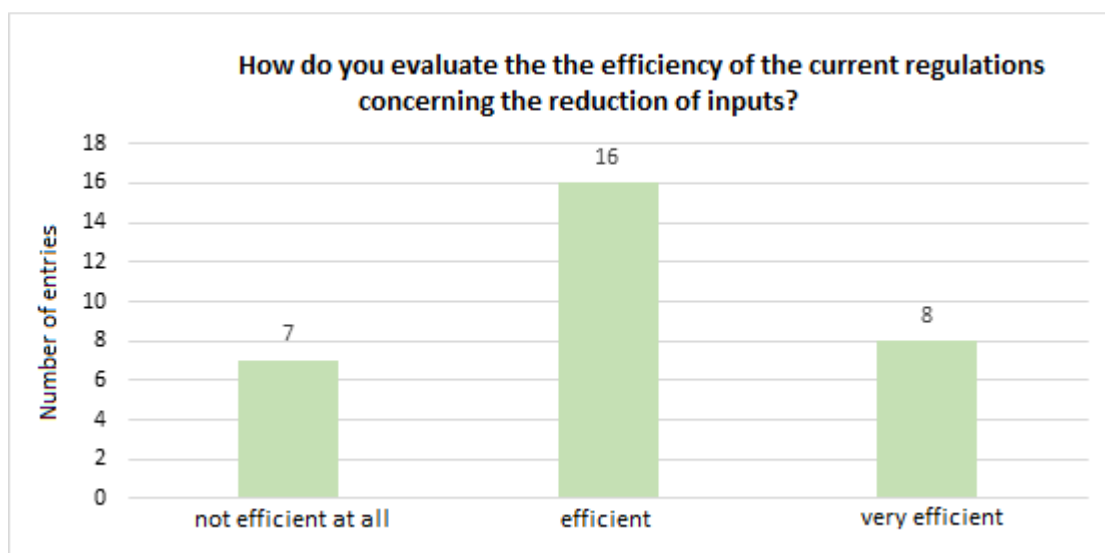
Most of the items mentioned fall under the headings of “statutory instruments”, “training” and “PR work”. It is evident however that the effectiveness of the individual measures is considered to be low. “Good examples” in particular are frequently mentioned in the supplementary comments as being useful in communicating with the target groups. Good examples are used both by agricultural colleges as well as by the “soil management advisory” (*Bodenberatung*) established in Austria.

Question 25. In your opinion, how effective are the provisions in force aimed at reducing the deposition of substances (e.g. Sewage Sludge Ordinance, Fertiliser Ordinance, crop protection etc.)?

Question 25 (around the issue of farming) was completed by 31 respondents (31 out of 82 = 38%).

A significant factor in precautionary soil protection is the minimisation of the deposition of substances from various sources, and especially from agricultural land-use. These include the deposition of both nutrients and harmful chemical pollutants.

Survey result



The responses given with regard to the effectiveness of provisions in force aimed at reducing the deposition of substances have yielded the following results:

- ▶ Defined control under cross-compliance rules
- ▶ Increasing general awareness, also as a result of pressure exerted by society large
- ▶ Statutory instruments are in place and are being implemented; some organisations offer training in the form of compulsory workshops and presentations; in some instances however measures have just been finalised or are under development.
- ▶ Insufficient compliance, in part, with existing instruments (= reluctance) and lack of control mechanisms (3 mentions)
- ▶ Highly effective with regard to sewage sludge, but only moderately effective in other areas; in some instances the levels of deposition are far too high even where there is compliance with the Ordinance (N) and substances do enter groundwater and surface water, a situation that points to insufficient monitoring for compliance with the Fertiliser Ordinance.

- ▶ Farmers and foresters are increasingly being involved in the development of agri-environmental measures
- ▶ Alpine regions block out the issue of sewage sludge and waste, blaming the lowlands, even though wastewater/waste also arise in Alpine regions. There is increasing pressure on farmers to intensify grassland management in the Alpine regions (including fertiliser use). Slurry applications turn flower-rich montane meadows into uniform green mats.
- ▶ It would be necessary to link livestock production to locally available agricultural land, i.e. the number of animals on a holding would be limited by the farm's land base.

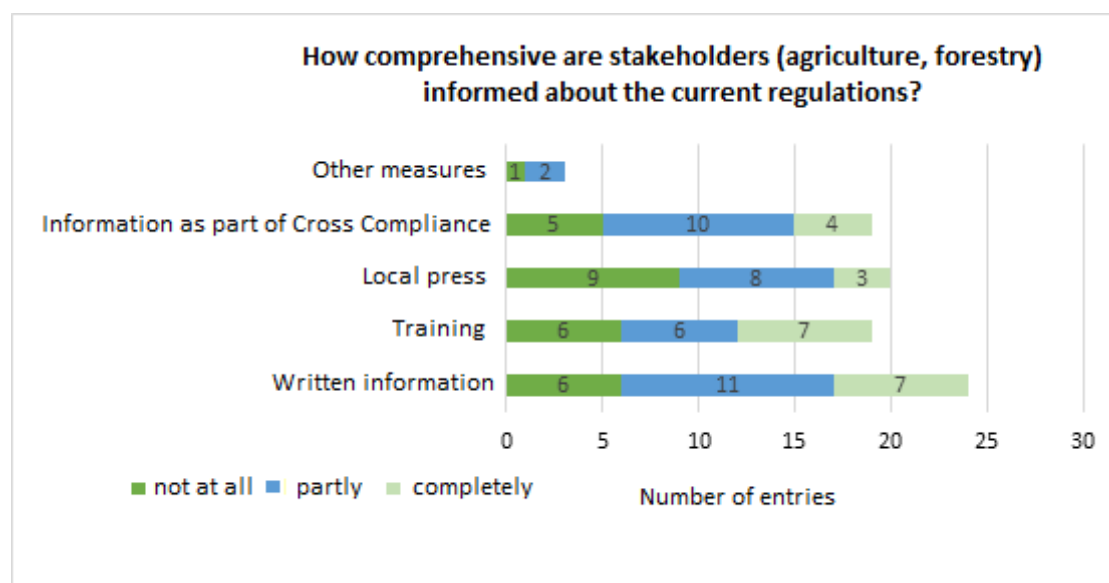
Brief interpretation of the result

The respondents' opinions with regard to the effectiveness of different instruments and their implementation are quite polarised, with some saying that awareness has been growing, that there is pressure from society at large, and that existing provisions are having the desired effect, all of which are resulting in a reduction in the deposition of substances. The other respondents are of the view that there is a lack of willingness [on the part of the farming sector] to truly minimise the deposition of substances, that due to a lack of controls, high levels of substances are still being deposited on land, and that additional measures are needed.

Question 25.1. In how far are the actors (farmers, forestry) kept fully informed as to the rules and regulations in force?

Question 25.1 was answered by 25 respondents (25 out of 82 = 30%).

Survey result



Supplementary information on "written information"

Cross-compliance brochure is, farming journals

- ▶ Information leaflets
- ▶ Literature, academic journals

- ▶ Primarily through the advisory institutions (Chambers) but also via the Internet.
- ▶ Nutrient budget for Austrian agri-environmental programme ÖPUL and cross-compliance
- ▶ Agriculture journals
- ▶ Information provided by the Chambers of Agriculture
- ▶ Information provided by the lobby (Chambers of Agriculture)
- ▶ Information is at hand that the actors are not interested in it – general information overload
- ▶ Legislation is available, but not successfully put in practice, best practices not enough p some markets resented, discussed and promoted

Supplementary information on "Training [advanced training]"

- ▶ Articles in newspapers' farming section, journal articles
- ▶ Print media (2 mentions), electronic media
- ▶ Catchy headlines often appear to be more important than comprehensive information.
- ▶ Journal articles
- ▶ [Will become relevant] where there are discernible issues
- ▶ "Salzburger Bauer" ("The Salzburg Farmer Weekly")
- ▶ Unfortunately this is not an issue that is discussed in the press.

Supplementary information on "Local Press"

- ▶ Articles in newspapers' farming section, journal articles
- ▶ Print media (2 mentions), electronic media
- ▶ Catchy headlines often appear to be more important than comprehensive information.
- ▶ Journal articles
- ▶ [Will become relevant] where there are discernible issues
- ▶ "Salzburger Bauer" ("The Salzburg Farmer Weekly")
- ▶ Unfortunately this is not an issue that is discussed in the press.

Supplementary information on "Information provided in the context of cross-compliance"

- ▶ Cross-compliance brochures, farmers' journals
- ▶ Information booklets and leaflets
- ▶ The rules and regulations are much to complex!!!
- ▶ AMA (Agrarmarkt Austria) information
- ▶ Application process for Austrian agri-environmental programme (ÖPUL; information provided by AMA and Chambers of Agriculture)
- ▶ Cross-compliance in general not explained and adapted to Alpine soils and thus not practiced well enough.

Supplementary information on "Other measures"

- ▶ Comment: The information is made available in full; whether it reaches the addressee and is understood is however another question.
- ▶ Agricultural training/education

Brief interpretation of the result

There would appear to be a large amount of information available (actively and passively) but it cannot be said with certainty how much of it reaches the target groups (highly complex subject

matter, relevance to specific Alpine issues with regard to soil, information focused on subsidies/support programmes etc.). The lowest rating was signed to the local press.

Question 25.2. How effective are measures to assess the actors' compliance with their duty to keep records?

Question 25.2 (around the issue of farming) was answered by 19 respondents (19 out of 82 = 10%).

Survey result



Please provide reasons for your reply:

- ▶ Growing interest [of the public] interest and understanding
- ▶ Give positive examples
- ▶ Sanctions result in financial burdens

Brief interpretation of the result

Spot checks as part of audits are seen as the most effective means of ensuring compliance with the rules, followed by written information, for example as part of training measures or as part of the curriculum taught at agricultural colleges, and by the duty to maintain records as part of the cross-compliance rules.

d) Quantitative soil protection/reducing land consumption

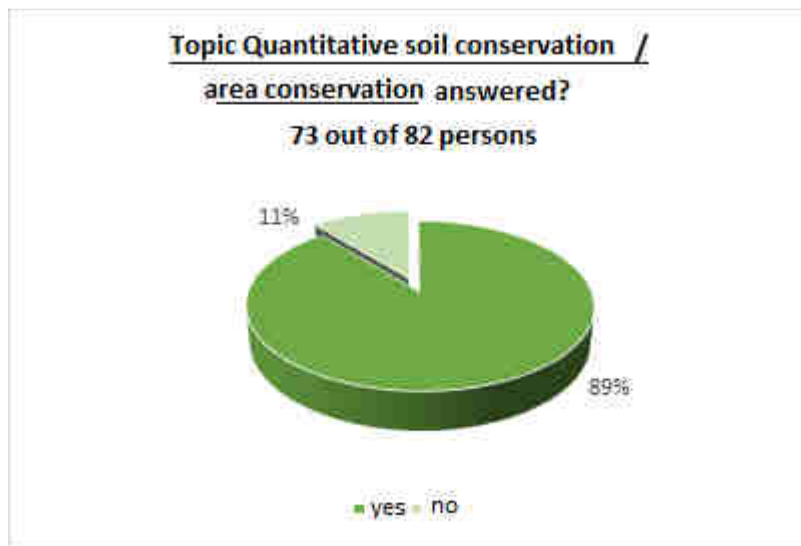
The term “land consumption” is used for the irreversible utilisation of unsealed soils for purposes of settlement, transport or economic development as well as for disposal or energy generation. Unsealed soils are the most important means of production for agriculture, they serve as areas for recreational use and, finally yet importantly, they provide a wide range of ecological services (see questionnaire segment b).

For many years now, higher than average rates of land consumption have been observed in many areas in the Alpine region; these have resulted from the sealing of soil surfaces and from building construction and often affect the in relative terms highest-yielding agricultural soils. There is thus obvious competition for land resources, which in the Alpine region are often very limited, resulting in particularly serious losses of productive agricultural land, while of habitats and biodiversity. Land consumption may also be seen as an aggregate indicator of adverse impacts on nature and the environment.

Articles 7, 8, 14 and 19 of the Alpine Convention’s Soil Conservation Protocol aim at limiting these site losses.

Pursuant to Article 5 SCP the Contracting Parties undertake to remove obstacles to international cooperation, including the provision and harmonisation of baseline data.

The questionnaire segment on quantitative soil protection/reducing land consumption was completed by 73 respondents (71 out of 82 =89%).



Questions 26 & 26.1: Is land consumption systematically recorded in your country (→Article 19(1) SCP) and, if so, could improvements be made in this regard in your country?

Approximately half (n=41) of the questionnaire respondents answered this question, with most of the respondents answering the question in the affirmative, as expected (34 answers = 83%). The 7

respondents who answered “no” presumably question that recording in their country is undertaken in a “systematic” fashion as indicated by the answers on desirable improvements.

Required improvements to recording (multiple responses allowed)	Number of mentions
No, recording methods are sound and results are valid	5
Yes, improvements are necessary with regard to data quality	24
Yes, improvements are necessary with regard to data acquisition	21
Yes, improvements are necessary with regard to the currentness of data	13
Yes, improvements are necessary with regard to (international) comparability (Article 19 (2) SCP)	16
Others (one mention each)	4

From these answers it is evident that there is a significant need for improvements with regard to statistics on land consumption in individual countries:

Only 5 of the respondents are fully satisfied with the manner and methods used to record this information.

24 responses criticise data quality, 21 criticised data collection, 13 criticise that the information is not up-to-date and 16 criticise the lack of international comparability. One free-text answer makes reference to insufficient temporal comparability, while another criticises that data are not comparable across Austria.

One comment that was attached to the English language version points out (and rightly so) that the term “land take” used in the original English version (perhaps more correctly “area consumption”) is ambiguous and, in the respondents’ opinion, could also be taken to imply a change in land-use (e.g. conversion of agricultural land to forestry).

In summary: There is as yet no internationally coordinated and reliable recording scheme for land consumption within the Alpine Conventions perimeter.

Question 27: In your opinion, how effective are regulatory measures aimed at reducing land consumption in your region (→ Articles 7(1) and (2) SCP)?

Responses were solicited using a 6-level scale (ineffective – highly effective). In the following Table, level 1 and 2 responses (ineffective / largely ineffective) and level 5 and 6 responses (largely effective / highly effective) respectively were combined:

Question 27

Measure	ineffective/largely ineffective		clearly effective/highly effective		Measure not available		No. of responses
	absolute no.	%	absolute no.	%	absolute no.	%	
Preparatory land-use planning	20	52,63%	5	13,16%	0	0,0%	38
Strategic environmental assessment (e.g. soil quality as a basis for zoning decisions)	24	50,00%	2	5,00%	5	12,5%	40
Site development levy	11	60,61%	3	9,09%	12	36,4%	33
Mobilisation of building land (e.g. by way of a legal obligation to implement developments)	12	62,50%	4	12,50%	5	15,6%	32
Graduated supports for housing developments	14	58,82%	4	11,76%	9	26,5%	34
Land-conserving binding land-use plans	14	50,00%	8	20,00%	7	17,5%	40
Retroactive densification	10	51,28%	11	28,21%	2	5,1%	39
Measures to limit land-use for transport infrastructure (e.g. regulations for parking spaces)	14	55,56%	9	25,00%	4	11,1%	36
Soil Protection Act	21	48,78%	4	9,76%	7	17,1%	41

What stands out in this assessment are the unfavourable ratings assigned to preparatory land-use planning, binding land-use plans and strategic environmental assessments, all of which are long established “standard instruments”. There are two ways to interpret this: either the instrument itself or its implementation are insufficient, or other drivers are so strong that these instruments are bound to fail.

Compared to these “static sovereign instruments”, “dynamic market economic instruments” appear to be much less widespread. In terms of their effectiveness, the instrument of retroactive densification clearly stands out in 25% of the respondents considered to be highly effective.

Soil Protection Act (insofar as they have been enacted) also appear to be strikingly ineffective: Less than 10% of the respondents consider them to exert strongly positive effects, while almost 50% consider them to be largely ineffective. This may be due to the fact that Soil Protection Act are primarily concerned with qualitative soil protection while quantitative aspects are only rarely taken into account.

The (few) free-text answers provide both positive and negative examples:

Legal basis lacking:	2 responses (no Soil Protection Act, Soil Protection Act has “no teeth”)
Enforcement deficit:	1 response (there is a need for stricter enforcement of existing provisions)
Enforcement is okay:	1 response (consistent denial of permits for hypermarkets in industrial estates)
Question is unclear:	1 response

Question 28. Do spatial and environmental impact assessments of large-scale developments explicitly reference the particular scarcity of available land in the Alpine region (→Article 7 (3) SCP)?

Out of 27 respondents, this question was overwhelmingly answered in the negative (n = 24). Moreover, there are conflicting views even as to the effectiveness of those assessment procedures that do take land scarcity into account: 3 responses mentioned enforcement deficits (“verbal indications with no effect”), while another 3 responses consider the way in which the issue is taken into account in assessment procedures as being correct or sufficient²¹.

Question 29. Are there officially prescribed mitigation measures for land-consuming developments in your region (→Articles 7 (1) and (2) SCP)?

This question was answered by 33 respondents. 22 responses confirm the existence of such mitigation measures while 11 respondents answered in the negative.

Prescribed mitigation measures	Responses
Mandatory mitigation for first-time surface sealing (e.g. unsealing of paved areas in core areas)	3
Mitigation by way of ecological compensation measures	21
Monetary compensation	11
Measures to protect the soil during construction or operation	9
Others:	4

Additional options listed in the free-text responses include soil-improving measures and a mandatory minimum proportion of unsealed areas in binding land-use plans (the latter however can *cum grano salis* not be considered to constitute a mitigation measure).

Question 30. Has mandatory restoration/re-cultivation been implemented in your region (→Article 7 (4) SCP)? Are there positive examples in your region?

Answers to the question on the status of implementation of Article 7(4) SCP were solicited using a 6-level scale (not implemented – fully implemented). In order to get a more clearly defined picture of the situation, level 1 and 2 responses (not / hardly implemented) and level 5 and 6 responses (largely / fully implemented) respectively were combined:

²¹ The question is not clear. In Slovenia, in case of large scale investments, a study of various alternatives is prepared, which is assessed from spatial, economic and environmental aspects (including, soil, air, water....) and from the aspect of social acceptance; the planning alternative is chosen in the participatory planning process and than further developed including environmental mitigation measures;

Implementation of mandatory restoration / re-cultivation (Article 7(4) SCP)	not or hardly implemented		largely or fully implemented		not applicable		Total answers
	abs.	% of relev. answ.	abs.	% of relev. answ.	abs.	% of answers	abs.
Decommissioned mining site / quarry	4	11,4%	20	57,1%	0	0,0%	35
Decommissioned industrial / commercial site	19	65,5%	1	3,4%	5	14,7%	34
Landfill site	2	6,3%	18	56,3%	2	5,9%	34
Abandoned recreational facility (e.g. ski resort)	15	57,7%	2	7,7%	6	18,8%	32
Abandoned transport site	16	64,0%	4	16,0%	8	24,2%	33
Abandoned settlement	15	88,2%	1	5,9%	15	46,9%	32

The answers paint a clear picture: Restoration measures for mining sites, quarries and landfill sites would appear to be largely standard undertakings. However, when it comes to follow-up uses of recreational facilities and surplus transport sites there seem to be major deficits in implementation. The abandonment of agricultural land is likely to be an issue primarily in the southern Alpine region (focus of the English language answers).

The strong votum by the German-speaking respondents with respect to the lack of restoration measures in abandoned settlements is difficult to interpret as in contrast to the southern Alpine region there are hardly any abandoned settlements in the northern Alps.

The respondents' free-text answers reinforce the image: Positive examples named include the re-cultivation of landfill sites, spoil heaps and extraction sites, the dual use of ski slopes for agricultural production as well as spatial development concepts, binding land-use plans and village restoration programs that are exemplary (also) from the point of view of soil protection. English-language contributions make reference to specific regulations on soil protection which are used in mountain regions in the context of construction management as well as sporadic local measures designed to combat land consumption.

Succession towards forests on former agricultural land is mentioned as a negative example, while opinions are mixed on the issue of the follow-up utilisation of agricultural land for settlements (reurbanisation) as well as on the successfulness of recultivation conditions as part of decisions issued by conservation authorities. An English-speaking respondent made a similar comment when he pointed out that the decision to abandon agricultural land-use and allow the process of succession to forest cover lies (solely) with the landowner.

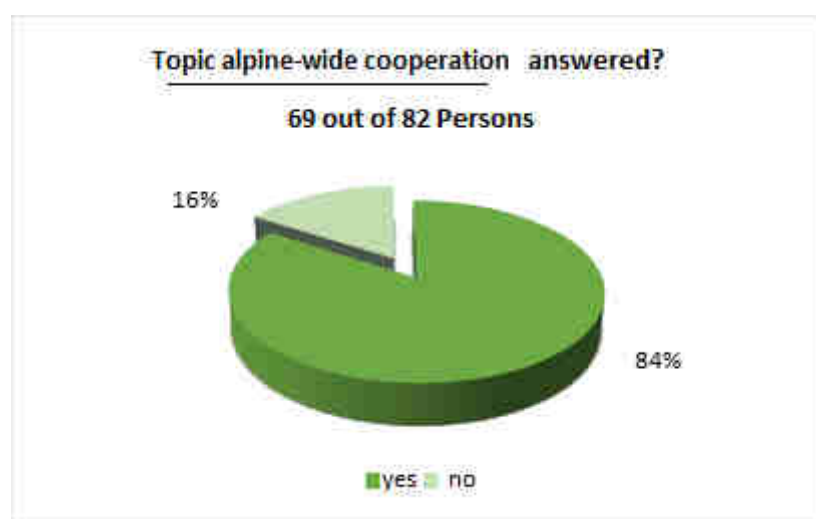
With a view to conservative land-use, one of the contributions makes reference to the existing legal compulsory enforcement options under the Spatial Planning Act (compulsory purchase for settlement and transport development) which are no longer applied.

This contrasts with the reference to an alleged paradigm shift associated with the new Swiss Spatial Planning Act, i.e. a massive restriction of greenfield residential developments and a clear priority for urban brownfield development.

e) International /pan-Alpine cooperation

Article 5 SCP aims at stronger international cooperation on the part of the Contracting Parties, especially with regard to the drawing up of soil registries, soil monitoring, the designation and monitoring of protected and impaired areas and hazard zones, the provision and harmonisation of databases, the coordination of Alpine-specific soil conservation research.

The segment on international / pan-Alpine cooperation was completed by a total of 69 respondents or 84% of those who responded to the questionnaire. 13 respondents skipped this segment stating that it does not fall within their area of expertise.

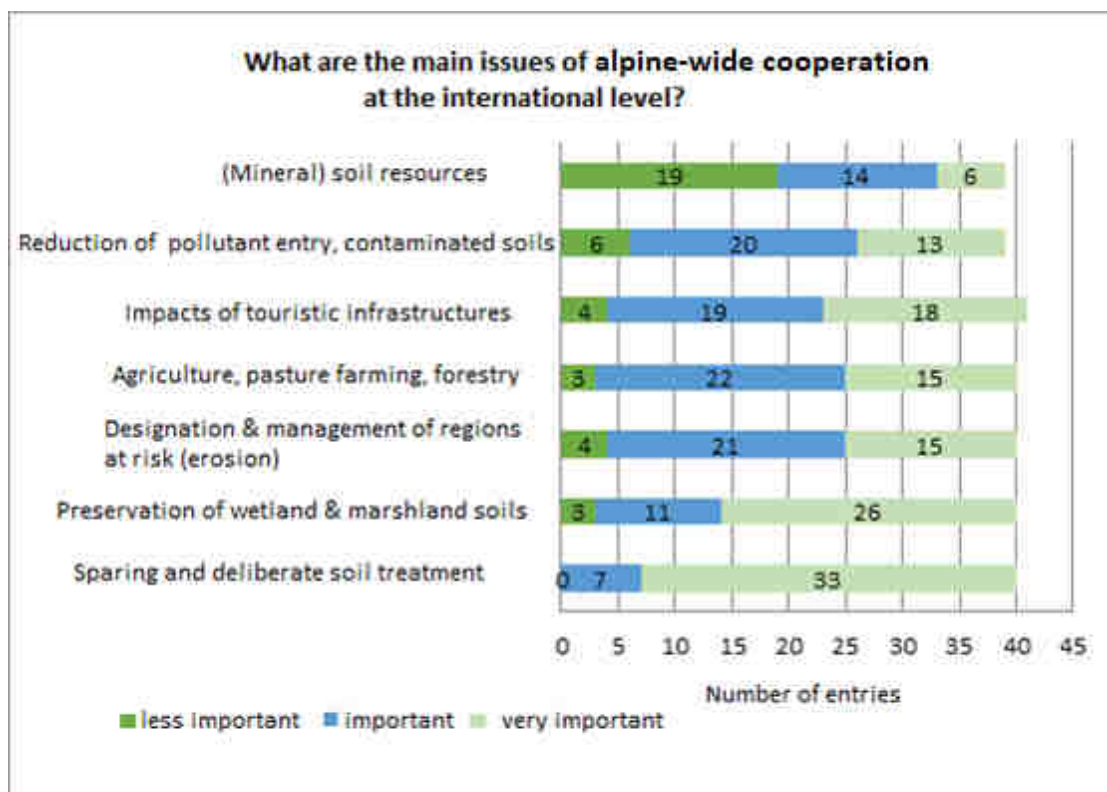


Question 31. In your opinion, which of the topics with respect to international / pan- Alpine cooperation are of the greatest significance to the effective implementation of the Soil Conservation Protocol?

Survey result

At the beginning of this segment of the questionnaire, respondents were given the opportunity to name those topics with respect to international / pan- Alpine cooperation they consider to be of the greatest significance to the effective implementation of the Soil Conservation Protocol (multiple responses allowed). This question was answered and skipped by 41 respondents each. The “economical and prudent use of soils” was named as the most important topic in pan- Alpine cooperation. 33 of the respondents considered this topic to be “very important”, while 7 respondents rated it as “important” and none of the respondents assigned a rating of “less important”. Similarly, the respondents consider the “conservation of soils in wetlands and moors” (peatlands) to be highly important: 26, 11 and 3 respondents rated this topic as being “very important”, “important” or “less important” respectively. Respondents assigned an “important” rating in roughly equal numbers to the topics of “effects of tourism infrastructure”, “designation and management areas at risk (of erosion)”, “agriculture, pasture farming and forestry”, “limiting inputs of harmful substances” and “contaminated soils”. Only the topic of “mineral resources” was assigned a rating of “less important” by the majority of respondents “19 mentions.

The most important topic in international / pan- Alpine cooperation with a view to the effective implementation of the Soil Conservation Protocol is the “economical and prudent use of soils” (pursuant to Article 7 SCP). However, judging from the answers given by the respondents all of the topics given above would appear to be significant in pan-Alpine cooperation. Only the topic of mineral resources would appear to be of lesser relevance in pan-Alpine cooperation and thus contribute to a lesser degree to the implementation of the Soil Conservation Protocol.

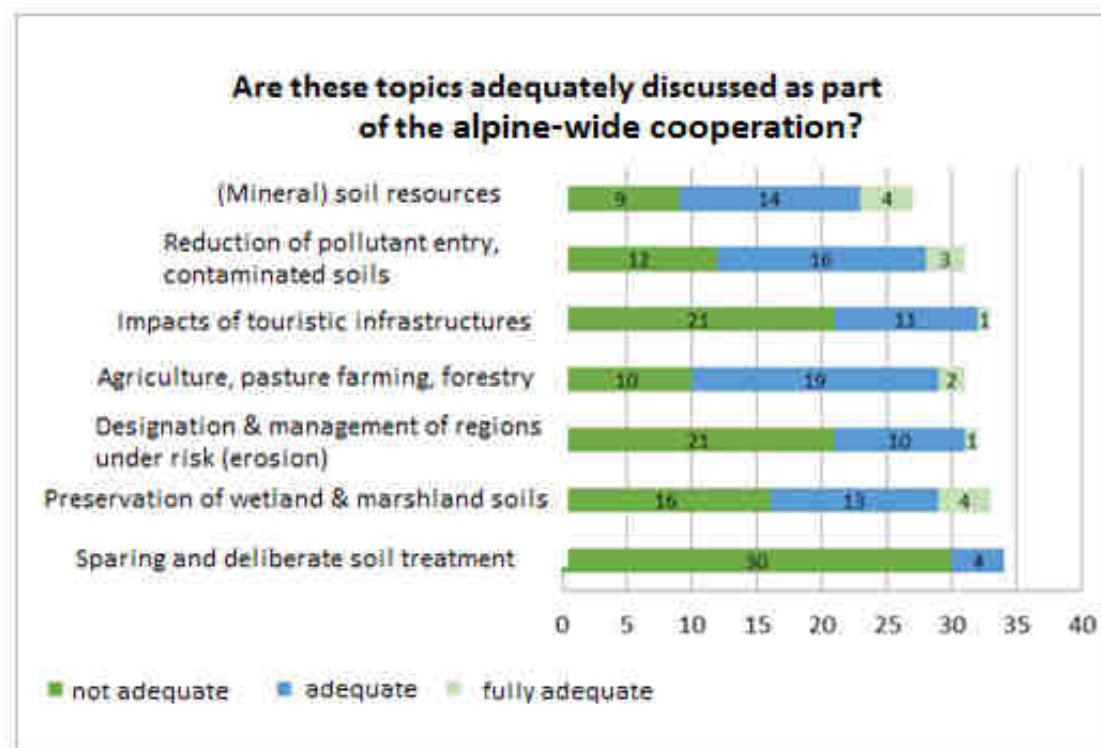


Question 31.1. Are these topics being given sufficient consideration in international/pan-Alpine cooperation?

Survey result

The question as to what constitutes the most important topics in pan-Alpine operation was followed by the question as to whether these topics are actually being given sufficient consideration in international/pan-Alpine cooperation. This question was answered by 34 respondents and skipped by 48. Judging from the respondents' answers, none of the topics are given sufficient consideration in international/pan-Alpine cooperation. It would appear that the least sufficient consideration is given to the topic of “Economical and prudent use of soils” (30 respondents reckon that this topic is not given sufficient consideration, 4 respondents are of the opinion that it is given sufficient consideration but none of the respondents considered to be fully covered). Similar to the answers given to Question 31, the picture is relatively balanced when it comes to the topics of “conservation of soils in wetlands and moors”, “designation and management of areas at risk (of erosion)”, “agriculture, pasture farming and forestry”, “effects of tourism infrastructure” and “limiting inputs of harmful substances: According to the respondents,

these topics are similarly given insufficient to sufficient (but not fully sufficient) consideration in international/pan-Alpine cooperation. The topic of “mineral resources” to which respondents assigned lesser importance in pan-Alpine cooperation under Question 31 would appear to be given sufficient consideration compared to the other topics.



Where respondents chose “insufficient” as their answer they were given the opportunity to freely expand on their rationale for this answer. In the majority, their individual statements refer to the topic itself and the reason for poor international/pan- Alpine networking. The respondents stated that the topic of soil conservation has been lacking and international/pan-Alpine “stage” and that not enough attention has been paid to the issue at the pan-Alpine level, resulting in it not being given sufficient consideration. Similarly, the respondents make reference to a general lack of networking on the topic of soil conservation and state that at the local/regional level, at which these topics are implemented, supra-regional cooperation is non-existent. As a further aspect of relevance to the insufficient consideration given to the topics, the respondents noted the regional differences within the Alpine region. In their opinion, this results in the topics not being addressed in a transboundary, pan-Alpine manner even though such an approach could yield joint solutions. Finally, the respondents claim that the lack of platforms and knowledge transfer for showcasing the results of individual projects are the reasons for the unsatisfactory level of consideration given to the above topics.

Question 32. Are you involved in tangible activities/projects as part of international/pan-Alpine cooperative efforts on soil conservation in the Alps pursuant to Article 5 SCP?

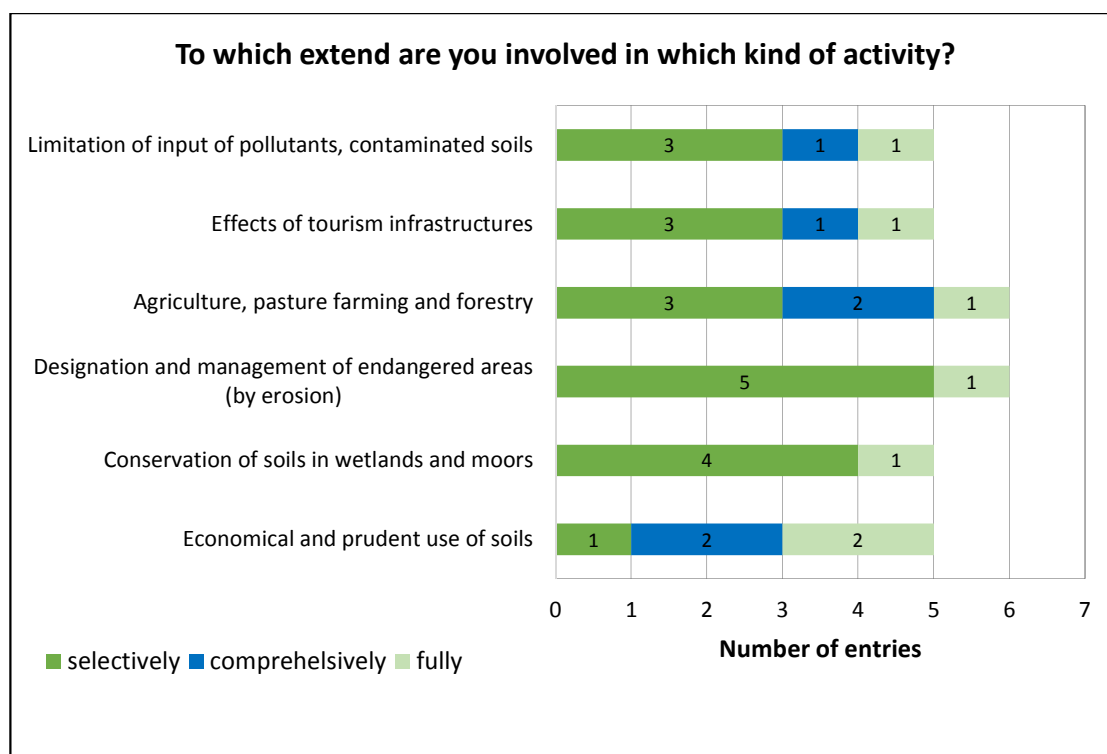
Survey result

The question as to whether respondents are involved in tangible activities or projects as part of pan- Alpine cooperative efforts on soil conservation was answered by 39 respondents while 43 respondents skipped this question. Only 7 respondents answered this question in the affirmative while 32 respondents answered in the negative.

Question 32.1. If yes, what activity do you engage in and how strong is your involvement in the following SCP topics? Please give a brief description of the activity.

Survey result

The question as to the degree of the respondents' involvement and the activity in which they are involved was answered by 9 respondents while 17 3 respondents skipped this question. Overall it is evident that most of the respondents' involvement in activities as part of pan-Alpine cooperation is merely of an occasional or short-term nature.



On the issue of the “economical and prudent use of soils”, respondents specifically listed the following activities:

- ▶ *Flächensparforum* 2015 (conference on reducing land consumption)
- ▶ Technical opinions on spatial development concepts, urban green corridors
- ▶ Working group on reducing land consumption as part of the Advisory Committee on Soil Fertility and Soil Protection at the Austrian Federal Ministry for Agriculture, Forestry, the Environment and Water Management (*Fachbeirat für Bodenfruchtbarkeit und Bodenschutz des BMLFUW*)
- ▶ Involvement in the Compliance Committee of the Alpine Convention

On the topic of the “Conservation of soils in wetlands and moors” only one specific activity was mentioned:

- ▶ Involvement in public authority’s procedures on the issue

On the topic of the “designation and management of areas at risk (of erosion)” respondents listed the following activities:

- ▶ Assessment of segments of terrain as part of planning procedures
- ▶ Mapping of areas at risk

In the area of “agriculture, pasture farming and forestry” respondents listed the following specific activities:

- ▶ Activities as part of the participation in the Mountain Farming Platform of the Alpine Convention
- ▶ Project assessments as part of planning procedures
- ▶ Depiction and management of forest ecosystem services in the field of natural hazards

On the topic of “effects of tourism infrastructure” respondents named the following two activities:

- ▶ Riedberger Horn /Allgäu (Bavaria)
- ▶ Project assessments as part of planning procedures and to an extent also in planning approval procedures

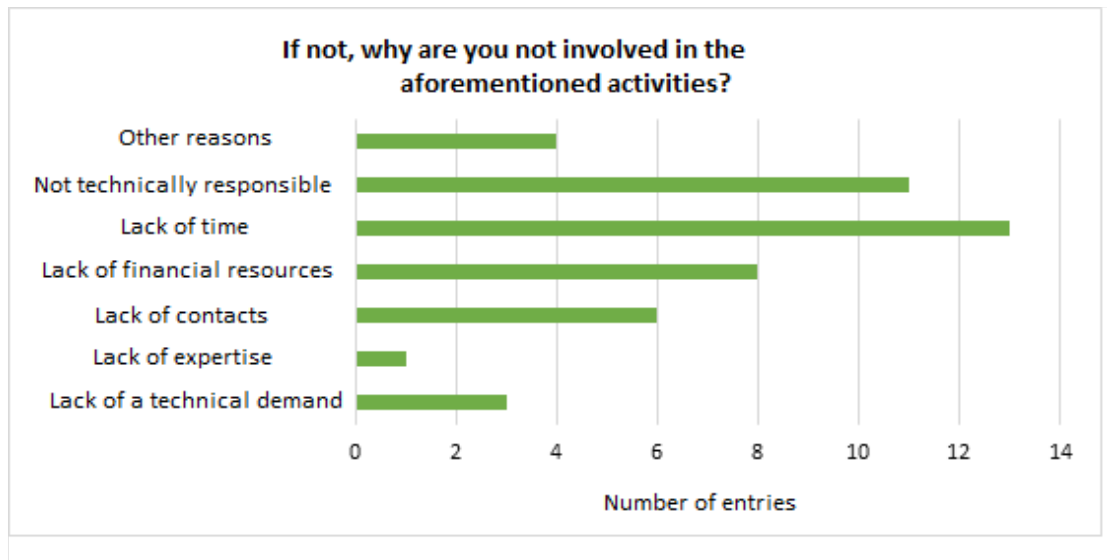
On the issue of “limiting inputs of harmful substances, contaminated soils” three respondents listed specific activities:

- ▶ Remediation of polluted soils and groundwater
- ▶ Interreg IVB Project AdaptAlp – Adaptation to Climate Change in the Alps
- ▶ On a case-by-case basis for new landfill sites

Question 32.2. If not, why are you not involved in any activities with respect to the topics given above? (multiple answers allowed)

Survey result

The question as to why respondents are not involved in any of the activities pursuant to Article 5 of the Soil Conservation Protocol was answered by 28 respondents and skipped by 54 respondents. With 13 and 11 mentions respectively, the most frequently mentioned reasons include “lack of time” and “outside of my area of responsibility”. Judging from the number of mentions, a “lack of financial resources” and “lack of contacts” would also appear to be a relevant cause of the lack of international/pan-Alpine cooperation. According to the respondents, a “lack of technical demand” or “lack of technical expertise” hardly play a role as reasons for their lack of participation.

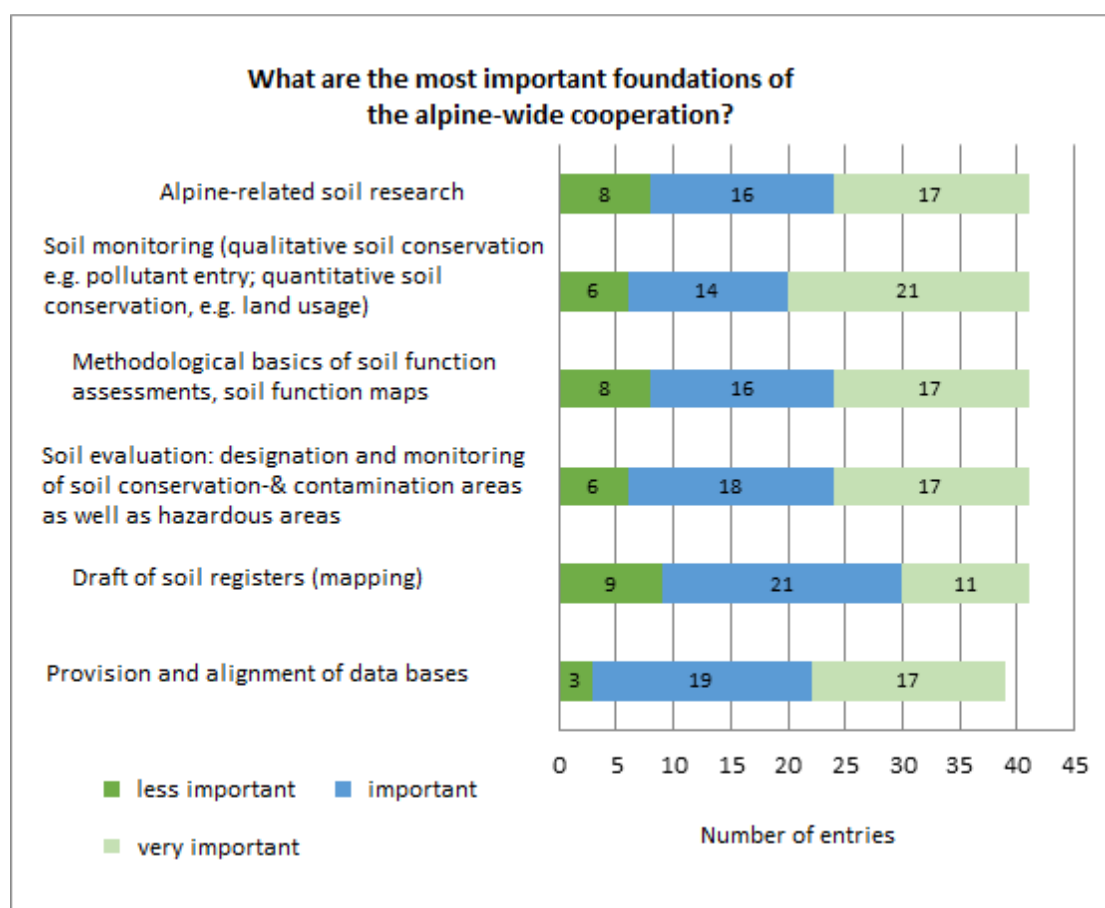


Four of the respondents gave additional reasons in the “Others” category, stating that these questions and issues are generally not dealt with in a transboundary manner because the baseline data are strongly heterogeneous in nature, because the executive level and the policy arena lack interest in these topics, because Switzerland has not ratified the Protocol which means that there are no activities, and that the Soil Conservation Protocol in general has not adequately been implemented, appearing to be a “dead paper”.

Question 33. In your opinion, what constitutes the most important fundamentals of international / pan-Alpine cooperation resulting in the effective implementation of the Soil Conservation Protocol (→ Article 5 (1) SCP)?

Survey result

The question as to what constitutes the most important fundamentals of international / pan-Alpine cooperation (cf. **Article 5 (1) SCP**) resulting in the effective implementation of the Soil Conservation Protocol was answered and skipped by 41 respondents each. This question allowed for multiple responses and 41 respondents assigned rankings of importance to each of the fundamentals (with the exception of “the provision and harmonisation of databases” – 39 respondents). Overall, the respondents considered all fundamentals of pan-Alpine cooperation to be “important” or “very important”. There is no discernible trend as to which one of the fundamentals might be of particular significance and should be given priority in pan-Alpine cooperation. Judging from the responses, all of the fundamentals would appear to be of roughly similar significance to pan-Alpine cooperation and thus to the effective implementation of the Soil Conservation Protocol.



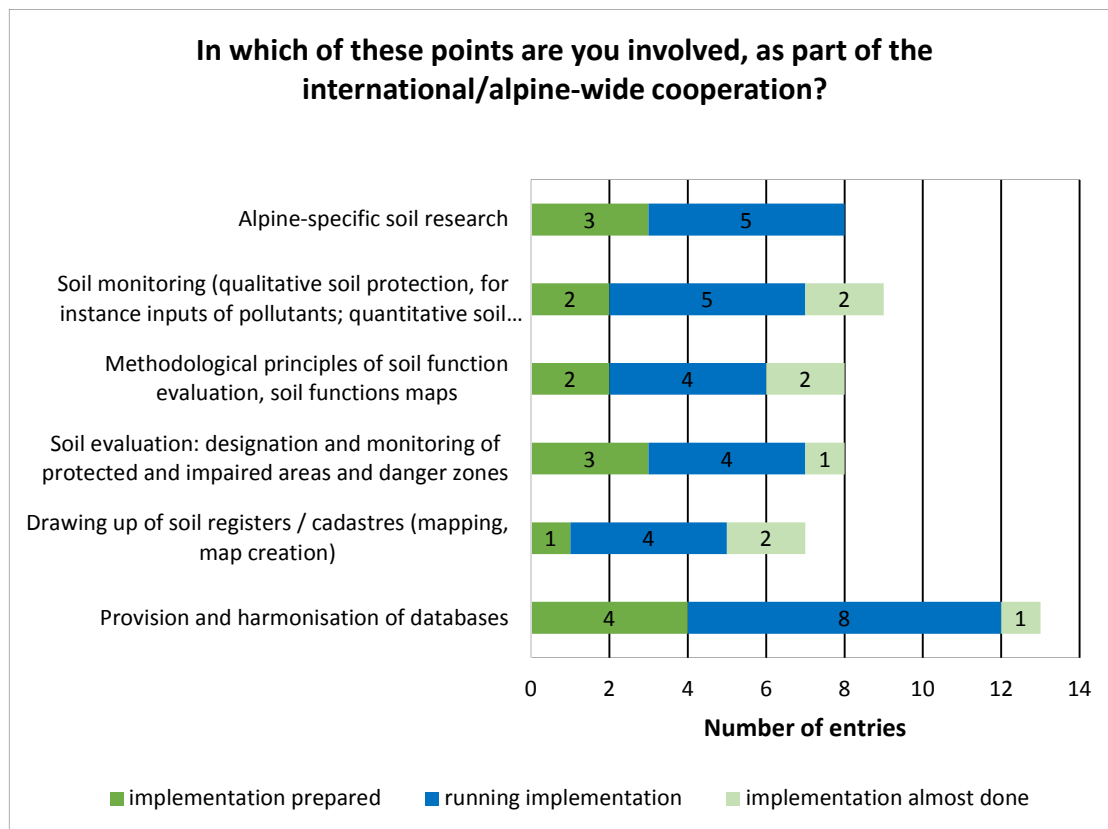
Question 33.1 Which of these fundamentals are you involved with in the context of international / pan-Alpine cooperation? Please also state the status of implementation.

Survey result

Following on from the question as to the significance of the different fundamentals, the respondents were asked whether they are involved with any of these fundamentals as part of any international / pan-Alpine cooperation. Respondents were given the opportunity to state the intensity of implementation so as to allow for conclusions on the status of implementation. This question was answered by 30 respondents and skipped by 52 respondents.

Most of the respondents are involved in the “Provision and harmonisation of databases” (13 mentions). Between seven and nine respondents each are involved with the other fundamentals in the context of pan-Alpine cooperation. It is obvious once again that relative to the total number of participating addressees of the questionnaire (82 respondents), only a small number of respondents are involved in working on fundamentals as part of pan-Alpine cooperation. In terms of the status of implementation, the majority of activities for all of the fundamentals was described as being in preparation or ongoing.

Additionally, three of the respondents noted under “Others”, that their involvement in work on these fundamentals is limited to the regional level, to work on green corridors as part of the ECONNECT Interreg IIIB Alpine Space Programme, and to the establishment of an informal transboundary network of soil experts.



Concluding general questions and outlook

In the final segment of the questionnaire, respondents were given the opportunity to name topics that may as yet have been given insufficient consideration in the Soil Conservation Protocol. Moreover, respondents were asked to list any measures or activities they consider desirable with a view to the (improved) implementation of the Soil Conservation Protocol. The respondents were given the opportunity to freely choose their answers, thus providing an expression of opinions as to future activities and recommended actions.

Question 34. Are there any current topics which, in your opinion, have as yet not been given any or only insufficient consideration in the Soil Conservation Protocol?

Result and brief interpretation of the survey

This question was answered by 36 respondents (36 responses = 44%) and skipped by 46 respondents. 22 of the respondents stated that current topics are already given sufficient consideration in the Soil Conservation Protocol while 14 respondents stated that current topics are not yet given sufficient consideration in the Soil Conservation Protocol. The majority of the respondents are of the opinion that current topics are given sufficient consideration in the Soil Conservation Protocol.

The respondents' relevant individual statements with regard to current topics which have as yet not been given any or only insufficient consideration in the Soil Conservation Protocol can be assigned to for different groups:

- 1) Insufficient attention is given to limiting the sealing of soil surfaces and concrete endeavours to stem the growing tide of land consumption. Given that these aspects are given general consideration in the Soil Conservation Protocol under Article 7 “Economical and prudent use of soils”, the respondents called for concrete reference values or threshold values for quantitative soil protection.
- 2) The harmonisation of methods, standards and interpretations for soil data surveys and recording is given insufficient consideration. While these topics are being addressed under Articles 5, 11, 20 and 21, the respondents’ individual statements indicate that the soil conservation protocol does not contain concrete specifications for the implementation of activities, or that despite them being mentioned in the Articles these activities are not sufficiently dealt with and hence have limited effect.
- 3) The issue of melting permafrost as a result of climate change is given insufficient consideration.
- 4) The topic of soil biodiversity is given insufficient consideration.

Two individual statements criticise the lack of concrete sanction mechanisms as part of the Soil Conservation Protocol.

Generally speaking, the Soil Conservation Protocol would appear to address most of the relevant topics. The respondents’ individual statements however show that the SCP lacks sufficiently concrete reference values and standards with regard to “land consumption, quantitative soil protection” and the “harmonisation of methods and standards for the collection, recording and interpretation of soil data”, resulting in insufficient implementation. The issues of permafrost and soil biodiversity are not given sufficient consideration.

Question 35. Can you name concrete measures / activities that would be desirable and contribute to the (improved) implementation of the SCP and to pan-Alpine soil protection?

Result and brief interpretation of the survey

A total of 33 respondents answered the question “Can you name concrete measures / activities that would be desirable and contribute to the (improved) implementation of the SCP and to pan-Alpine soil protection?” (33 responses = 40%) while 49 respondents skipped this question. Several of the 33 respondents who answered this question submitted more than one answer; 43 measures and activities were listed in total. The open-response format allowed respondents to directly name measures / activities they consider desirable, and thus provides a free expression of opinions.

The individual statements may be assigned to the following five categories: “Awareness-raising, knowledge transfer, PR work and lobbying”, “binding legal force”, “from international down to local networking”, “reorientation of spatial planning”, and “specialist topics”.

The majority of statements fall into the “awareness-raising, knowledge transfer, PR work and lobbying” category (21 mentions). Most of the respondents stated that awareness-raising measures on the issue of soils would be desirable, both at the local level and in the policy sphere, including decision-makers. They also listed activities aimed at improved public relations, knowledge transfer and general awareness-raising on soil protection, on the Soil Conservation Protocol and legal obligations, especially at the local level (municipalities). A further desirable measure is the

provision of local and transboundary best practice examples in soil protection, which can be emulated by other actors. Additionally, the respondents called for a greater number of application-oriented symposia, seminars and workshops on the implementation and applicability of the Soil Conservation Protocol.

Several respondents also mentioned improved knowledge transfer and exchanges at the international level. More specifically, the respondents requested a joint information platform for the exchange of experiences (such as the Austrian soil platform) or improved pan-Alpine cooperation between administrations and political representatives as part of the EUSALP. The respondents also stated that improved implementation of tangible measures necessitates improved information and knowledge flow between federal states and regions as well as between the individual Alpine countries.

Given that most of the responses make reference to the desirability of closing knowledge gaps, it would appear that knowledge gaps on soil protection, the SCP and its applicability both at the local and political levels are a significant problem, hampering the Protocol's implementation. Similarly, based on the individual statements it is possible to conclude that cooperation and exchange of information at the pan-Alpine level as well as within individual Alpine countries and regions are deficient. Improved knowledge exchange, e.g. using best practice examples could contribute to the improved implementation of pan-Alpine soil protection and of the Soil Conservation Protocol.

The need to improve the Protocol's "binding legal force" was mentioned eight times. Individual statements under the setting included, in particular, calls for prohibitions or sanction mechanisms, financial compensation and incentives with a view to reinforcing the provisions' legally binding nature (e.g. by way of prescribed deadlines). The respondents also described as desirable the legal harmonisation (e.g. as a result of Switzerland's ratification of the SCP) and alignment of binding legal provisions as part of the SCP at a pan-Alpine level. They also called for a clearer presentation of the SCP's legal relevance at the European level.

From the individual statements one can reasonably conclude that the Soil Conservation Protocol's implementation is deficient as it lacks a legally binding nature backed up by e.g. sanction mechanisms.

The "international down to local networking" response category consists of five mentions. Respondents ask for international networking between scientists and soil actors on a range of different specialist topics (since experts at the different levels do not tend to know each other), a pan-Alpine soil observation network, or the establishment of a pan-Alpine/international stakeholder network on soil protection (administration, scientists, NGOs etc.).

The responses given in the "international down to local networking" response category interface with the responses given with regard to knowledge transfer. However, they do mention tangible actions for international/pan-Alpine networking that would be desirable in the future. This suggests that the improvement or commencement of cooperation and pan-Alpine exchanges could result in improved soil protection and SCP implementation.

A further four individual statements can be assigned to the "reorientation of spatial planning" category. The reorientation of spatial planning, i.a. with respect to reduced land consumption, was listed as a desirable measure. In this context, respondents called for objective criteria and zoning instruments, improved technical expertise at the municipal level, the decoupling of purely political

decisions in favour of an orientation towards expert decisions, and functioning spatial planning acts.

These responses suggest that in their implementation, spatial planning and spatial development planning and not sufficiently strong to adequately address issues of quantitative soil protection (e.g. reduced land consumption).

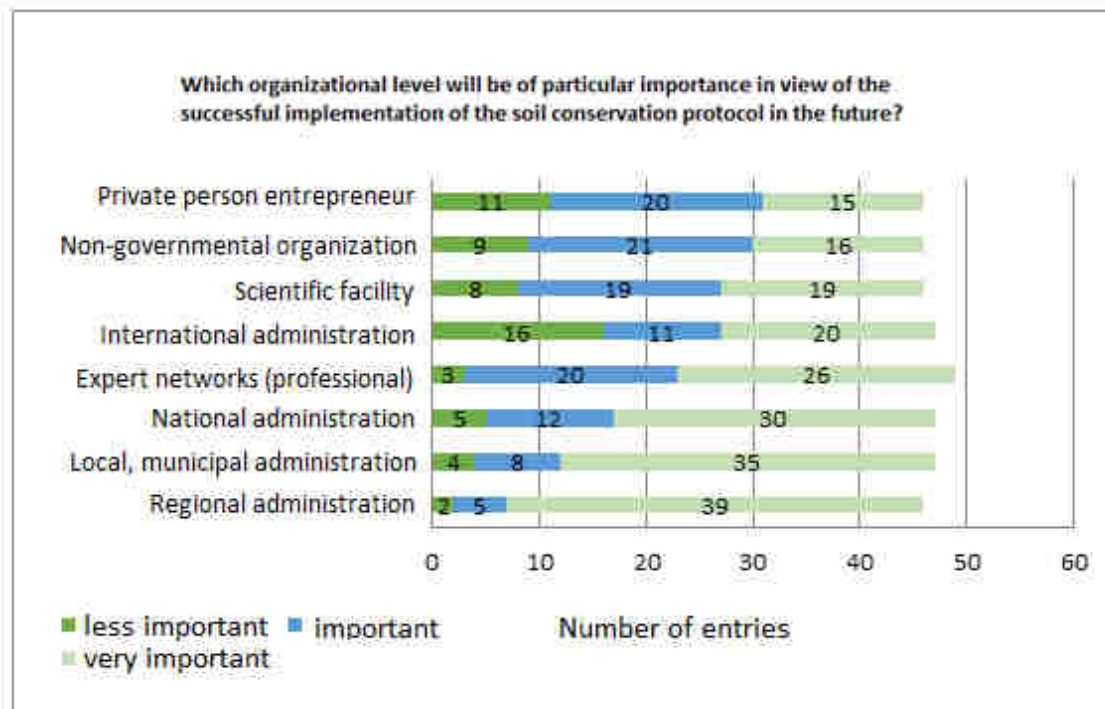
Finally, a further five individual statements can be assigned to the “specialist measures and activities” category. Desirable measures listed by the respondents include improved organic farming and support schemes for the farming sector, an increased awareness of the existential significant of soils and their functions for life (ecosystem services), and the delimitation of hazard areas including the implementation of technical activities aimed at improving their protection.

Question 36. Which organisational level will be of particular significance in the future with respect to the successful implementation of the Soil Conservation Protocol?

Survey result

The question as to which organisational level will be of particular significance in the future with respect to the successful implementation of the Soil Conservation Protocol was answered by 50 respondents (50 responses = 61%) and was skipped by 32 respondents. This question allowed for multiple mentions so as to provide for an expression of opinions with respect to the significance of the various levels.

The regional administrations, the local/municipal administrations and the national administrations were considered to be the most significant organisational levels. Specialist expert networks, scientific institutions, and non-governmental organisations were considered to be “important”, while international administrations and private individuals/businesses were considered to be “less important”.



The reasons given in the respondents' individual statements as to why they consider these levels to be of significance can be categorised as follows:

The SCP is of particular significance at the local and regional levels given that, according to the respondents, this is the administrative level at which the Protocol as well as concrete measures will increasingly be implemented. In this context, respondents stressed that especially the local level has not become sufficiently familiar with the SCP and that there is a need to increase awareness of the importance of soil protection and of the SCP. As their rationale for the significance assigned to the different levels, the respondents also mentioned the need for improved networking between all administrative levels with a view to fostering knowledge exchange and coordination, given that all organisational levels play a role in implementing the SCP. In the context of improved networking, the importance of involving all Alpine countries with the support of specialists and experts as well as the involvement of the regional and local administrative levels was noted. Similarly, the establishment of expert groups on different topics was described as a relevant organisational level. Finally, mention was made of the involvement of private individuals, businesses and also citizens, especially when it comes to activities aimed at reducing land consumption.

At this point, respondents criticised the fact that the national level does not draw up concrete measures for implementation by the downstream administrative levels which results in fewer activities to be implemented. Additionally, respondents criticised the fact that in many cases (research) projects are profit-oriented and that soil conservation is not addressed in a cross-sectoral manner, which results in a lack of cooperation and harmonisation of legal obligations and expert views.

Question 37. Are there any other issues you would like to address as part of this questionnaire?

Survey result

Concluding the questionnaire, the respondents were given the opportunity to elaborate on other issues they would like to address as part of the questionnaire. Twelve of the respondents replied to this question. Their responses refer to the SCP and to pan-Alpine soil protection, not to the questionnaire design.

The respondents concluded their statements by reiterating the desirability of improved information and awareness at the local and regional levels, e.g. on the part of mayors and the population at large. Moreover, the respondents provided further general information on the SCP and stated that it has almost been forgotten. Further statements also highlighted the need for directly applicable provisions in the future, criticised the Protocol as being unrealistic, and wondered whether other Alpine countries encountered similar problems in its implementation. Two responses refer to the desirability to establish a pan-Alpine working group on soil protection and the establishment of a working group on soil protection as part of the Alpine Convention, representing relevant stakeholders from the administrations, the scientific community, and NGOs.

6.2 Annex 2: Policy Paper: “The Soil Conservation Protocol of the Alpine Convention – A Role Model for European Legislation on Soil Protection?”

Universität Innsbruck

Institut für Öffentliches Recht, Staats- und Verwaltungslehre
 assoz. Prof. Dr. Sebastian Schmid, LL.M. (UCL)

Innrain 52d | A-6020 Innsbruck

Telefon +43 (0) 512 / 507 - 8213 | Fax +43 (0) 512 / 507 - 2828

E-Mail sebastian.schmid@uibk.ac.at | Internet <http://www.uibk.ac.at/oeffentliches-recht/>

I. Introduction

In May 2014, the European Commission decided to formally withdraw the Proposal for a Directive establishing a framework for the protection of soil.²² It had already been put off in the years before after a group of Member States – the United Kingdom, Germany, the Netherlands and Austria being among them – were firmly opposed to the framework. Nonetheless, soil protection continues to be the subject of discussion and controversy since the Union and its Member States have agreed to “reflect as soon as possible on how soil quality issues could be addressed using a targeted and proportionate risk-based approach within a binding legal framework” in the 7th General Union Environment Action Programme.²³

In context of the above, the question arises whether the Soil Conservation Protocol of the Alpine Convention can serve as a model for European legislation on soil protection. By now, this international treaty is the only binding and comprehensive international framework on the conservation and restoration of soils. What are the reasons that can explain the “success” of the Soil Conservation Protocol? Why did the contracting parties of the Alpine Convention agree on this controversial issue whereas agreement still seems far off on European level?

II. The difficulty of issuing rules on soil protection

The European Union is not alone in its struggling to achieve comprehensive laws on soil protection. In the United States of America, for instance, the law of soil conservation exists as an “unwieldy number of disconnected federal and state statutes. For the most part of administrative character, they have been dictated by regional requirements, departmental exigencies, and the desire to avoid constitutional issues.”²⁴ Since its beginnings, soil conservation legislation has operated almost entirely without the power of compulsion; financial benefits to private landowners have been its principal lever.

In Germany, the Federal Soil Protection Act came into force in 1998,²⁵ after it had already been on the agenda of former Federal Governments, for instance, as a declared aim stated in the Environmental Programme 1971.²⁶ In parallel, several German states enacted own soil protection laws, which aimed at the establishment of instruments of control and prevention but were criticised for being ineffective due to cautious regulations.²⁷ A main reason for the length of this

²² OJ 2014, C-153/3 and OJ 2014, C-163/15 (corrigendum).

²³ OJ 2013, L-354/171. See also OJ 2014, C-163/15, fn. 1 “The Commission remains committed to the objective of the protection of soil and will examine options on how to best achieve this.”

²⁴ *Karl F. Milde*, Legal Principles and Policies of Soil Conservation, *Fordham Law Review* 20 (1951) 45.

²⁵ German Federal Law Gazette I 1998, p. 502.

²⁶ See *Fokuhl*, *Rechtliche Situation und Entwicklung des Bodenschutzes in Deutschland*, *Naturschutz und Landschaftsplanung* 26 (1994) 49.

²⁷ *Stollmann*, *Die Bodenschutzgesetze der Länder*, *Natur und Landschaft* 71 (1996) 367.

legislation process was the fragmented separation of powers between the Federal state and the “Länder”.²⁸

The following overview summarises the main causes for the difficulties, which often come along with legislation on soil protection:²⁹

➤ Complexity of the subject-matter concerned

Unlike air and water, soil is not a homogeneous environmental medium. It is a mixture of minerals, organic matter, water, gases, liquids and organisms. Thus, it has different functions: It is a habitat for soil organisms, transforms organic materials into humus and is, thus, a necessary precondition for plant growth. Due to its regulatory function, soil is a recycling medium for water, it absorbs harmful substances from the air and effectively neutralises them. Besides these ecological functions, soil – literally – is the basis for our buildings and other physical structures. As a deposit for minerals and energy resources, it has always been exploited by humans. Besides, soil is an archive for the history of nature and civilisation, and we also spend our leisure time running and hiking on natural or semi-natural ground.

➤ Variety of the legal contents

As a consequence of the complexity of soils, legal provisions concerning soil protection have to deal with a wide variety of issues and, thus, they are usually complex and divers. Soil protection law can usually be found in many different legal acts.³⁰ The most common way of categorisation is to distinguish between quantitative and qualitative soil conservation. In detail, five regulatory approaches can be identified:³¹

According to the *spatial* approach, natural and near-natural soils are regarded as worth protecting by size and quantity. Such provisions can often be found in acts on spatial planning as well as in soil conservation acts.

In other legal provisions, soil is treated as an *environmental medium* such as air and water. It shall be protected against any type of pollution or other adverse effects. Acts on environmental and soil protection often include regulations of that kind.

When a *pollutant-oriented* approach is chosen, certain harmful substances are in focus of a regulation; their adverse effects on the environment, including soils, shall be restricted. Plant protection products regulations are an example of which.

Other regulations which can be regarded as part of the soil protection law enact provisions on *industrial plants* because of the exhaust emission which goes along with their operation. Plant approval procedures and environmental impact assessments are examples of that kind of soil conservation law.

Finally, provision on air and water protection can be regarded as *mediated* soil protection. Because of the interaction and interdependence between these environmental media, minimizing the pollution of air and water also means protection of soils.

²⁸ *Peine*, Die Gesetzgebungskompetenzen des Bundes für den Bodenschutz, Natur und Recht 1992, 353.

²⁹ See e.g. *Odendahl*, Bodenschutz nach Völkerrecht: Bestandsaufnahme und Entwicklungsperspektiven, Archiv des Völkerrechts 39 (2001) 82 (99 ff).

³⁰ For an overview see *Mayrhofer*, Bodenschutz – Die Alpenstaaten im Vergleich, Die Alpenkonvention 2015, 10.

³¹ See *Schmid*, Bodenschutzrecht in Österreich, Die Alpenkonvention 2015, 7 (8).

➤ Soil protection – a horizontal issue

The outline above makes clear, that soil protection is a so-called horizontal issue. Traditionally it is not a subject-matter codified in one book as it is the case, for example, for legislation on water or nature protection. Instead, immediate and mediate soil protection law can be found in many different acts. This fragmentation makes it difficult to codify soil conservation law and also raises the question whether there is any point in unifying it. However, the main task of legislation on soil protection consists in the creation of a system which would benefit the long term efforts of conservation. So, to increase the effectiveness of soil conservation is the main reason of a codification.

➤ Division of powers

One reason for the fragmentation of soil protection law and for the difficulties of legislation on soil conservation is division of powers, in federal states between the different regional authorities, in the European Union between the Union itself and the Member States. The Commission has sought to put the Proposal for a Directive establishing a framework for the protection of soil on a sound legal basis. It has been argued that the provisions of this Directive relate to environmental protection and, consequently, the legal base chosen was art. 192 para. 1 TFEU (art. 175 para. 1 TEC). With regard to the principle of subsidiarity, the Commission was clearly trying to provide detailed arguments why the objectives of the proposal cannot be sufficiently achieved by the Member States.³²

➤ Ownership of land

Whereas air and water are regarded – at least to a certain extent – as common good, land is subject to possession and ownership. The traditional and somehow emotional view on land as reflection of privacy and self-determination is another reason why regulation on soil issues has not been on the agenda of legislators for many decades. Accordingly, the Commission has pointed out that “[s]oil is a resource of common interest to the Community, although mainly private owned, and failure to protect it will undermine sustainability and long term competitiveness in Europe.”³³

➤ The territory as part of national sovereignty

On first sight, soil is an immobile environmental medium whereas air and water constantly cross borders. Pollution and degradation of soils, thus, are limited to the country concerned and do not interfere with the interests of others. However, there are many reasons why the opposite is true: “Soil degradation in one Member State or region can have transboundary consequences. Indeed, dams are blocked and infrastructure is damaged downstream by sediments massively eroded in another country farther upstream. Equally, groundwater bodies flowing through bordering nations can be polluted by contaminated sites on one side of the border. [...] This would imply that the costs to restore environmental quality are borne by a Member State different from that where the soil degrading practice occurred.”³⁴

³² See COM(2006) 232 final, p. 6.

³³ See COM(2006) 232 final, p. 2.

³⁴ See COM(2006) 232 final, p. 6.

➤ Lack of soil awareness

It has often been argued that lack of soil awareness is one reason for the inadequate protection so far. Pollution and degradation of soils are sometimes not immediately visible and they can be covered up by certain measures like fertilisation. The hesitancy in the conservation of soil and in creating awareness about soil as medium worth protecting is also highlighted by the fact that regulation on other fields of environmental law has a long tradition, whereas legislation on soil issues is a relatively new area of law.

III. The Soil Conservation Protocol – negotiating process and contents

The Environment Ministers of the Alpine states had already agreed on common goals and priorities in the field of soil protection at the International Alpine Conference in Berchtesgaden in 1989. Considering the risks for soils which could arise from on-going sealing and erosion, the results can be summarised as follows: economical use of soil and land (n. 46), use of soil conserving production technologies in agriculture and forestry (n. 46), promotion of a form of agriculture in the Alpine region which suits local conditions (n. 47), prevention of natural risks (n. 47), conservation of the vegetation cover (n. 47), setup of national soil inventories based on common criteria in order to determine which actions have to be taken (n. 48 and 49), definition of common guidelines and standards of soil protection (n. 50).

Following this wide-ranging outcome of the first Alpine Conference of the Environment Ministers, the Alpine states agreed in 1991 to enter into a new international treaty, the Alpine Convention. Its art. 2 para. 2 lit. d addresses soil conservation and states that “the objective is to reduce quantitative and qualitative soil damage, in particular by applying agricultural and forestry methods which do not harm the soil, through minimum interference with soil and land, control of erosion and the restriction of soil sealing.”

The preliminary fixings of the Alpine Conference 1989 and the Alpine Convention created a sound basis to conduct negotiations on a Soil Conservation Protocol. The consultations started in 1991 under the leadership of the German delegation. Good fortune or strategy – the fact that at the same time the adoption of a German “Bundes-Bodenschutzgesetz” was intensively discussed definitely supported the progress of the negotiations.

A first draft was prepared in October 1993; others followed in August 1994, in September 1994, in December 1995, in July 1996 and in July 1997.

The negotiations on article 14 of the Soil Conservation Protocol (“Effects of tourism infrastructure”) are an example of how the contracting parties tried to come up with formulations that would meet all of the expectations involved:

The last draft adopted at the level of officials included two versions of Article 14. All contracting parties except the French delegation were in favour of an alternative (known as the Montafon text) which stated, for instance, that permits for the construction and levelling of ski runs are not granted in forests with a protective function and for fragile areas and which included restrictions for the use of vehicles for the grooming of ski runs. Obviously, this proposal was rather far-reaching with regard to its soil protection contents. The other alternative was a compromise text suggesting to the contracting parties (only) that the effects of tourist infrastructures shall be observed and that they shall act with a view to stabilise soils, which had been affected by intensive touristic use. The final version, negotiated at political level, is a mixture of both alternatives; however, the majority of the contracting parties managed to convince France to agree in large part to the Montafon text. It is no coincidences that Article 14 Soil Conservation Protocol – one of

the few provisions of clear content – played an important role in the application of the Alpine Convention by the courts in Austria. In the leading case concerning the direct applicability of the Convention Protocols in Austria in 2003, the authorities did not grant the permission to merge two ski resorts by way of construction measures on the legal basis of this provision.³⁵

When comparison is made between the First and the Final Draft, two developments become clear which somehow run counter: On the one hand, some provisions of the First Draft have been reworded in a more precise manner and others have been restructured so that like contents were brought together. One example for a specification is art. 9 para. 3 of the Protocol: In the First Draft, this provision reads as follows: “Utilised agricultural moor soils shall be managed in a way that the loss of soil organic matter is prevented and sustainable use of grassland is guaranteed.” At that time, the focus was put on the usage of moor soil and not so much on conservation and restoration of a near-natural state. In accordance with para. 1 of the same provision which clearly spells out that the “Contracting Parties undertake to preserve high moors and lowland moors”, para. 3 was reworded in 1997: “On principle, moor soils shall not be utilised or, when used for agricultural purposes, shall be managed so that their characteristic features remain intact.” This change in the formulation establishes a hierarchy of goals: First and foremost, moors shall not be utilised at all. However, the conservation of moors depends in some cases on agricultural maintenance, for instance, to prevent the formation of woodland and scrub. Furthermore, the treatment of wetlands with low environmental impact methods is often a traditional way of farming and, thus, shall not be prevented generally. In these cases, when moor soils are used agriculturally, the technics and methods of usage shall guarantee the functionality of moor soils in order to preserve them in their special characteristic.

An example for the restructuring of the First Draft is art. 11, “Designation and management of Alpine areas threatened by erosion”. In this provision, contents of the former art. 10, 13 and 14 have been united in order to create a “focal point” for the particular issue of erosion.

On the other hand – this second development seems to be of a particular importance for the purposes of this paper –, certain contents of the First Draft have disappeared from the version which finally came into force. Unsurprisingly, rules adopting regulations in controversial areas, i.e. tourism and agriculture, were affected by this revision; they have been tempered or have even been deleted from the First Draft. Initially, the contracting parties agreed to limit the uncontrolled expansion of tourist infrastructure by defining geographical limits (art. 11 para. 1). They also decided that, basically, no tourist facilities will be developed in glacial zones (art. 11 para. 2). The use of vehicles for the grooming of ski runs was limited to periods, when the vegetation cover is sufficiently protected by snow (art. 12 para. 2). None of these provisions “survived” the negotiation process and, hence, they did not come into force.

The same applies to certain articles in the initial draft on agricultural issues which were deleted by and by. Neither the requirement that Alpine pasture areas have to be managed in a form which suits local conditions (art. 13 para. 3), nor, the provision that certain plant production products shall be generally forbidden (art. 17 para. 4) were enacted.

Following a similar trend, the wording of some articles was changed in a manner which undoubtedly made clear that the obligations resulting from the Protocol should become less restrictive. Clear commitments by the contracting parties were replaced by declarations of intent. According to the clear wording of the First Draft, the contracting parties “undertake” to designate,

³⁵ Constitutional Court 22.9.2003, B 1049/03-4; Independent Environmental Tribunal 22.3.2004, US 6B/2003/8-57 (*Mutterer Alm*); Administrative Court 8.6.2005, 2004/03/0116.

provide and make sure that certain measures are taken.³⁶ At the end, these provisions only stated that the Alpine states “shall” see to it, provide and make sure that, for instance, engineering techniques are used in endangered areas which are as compatible with nature as possible.³⁷

These examples disclose a process of on-going softening of the initial drafts so that they became less binding and all contracting parties were able to accept the outcome at the end. This is a process which may happen with certain frequency when international contracts are negotiated.

IV. “Recipe of success” of the Soil Conservation Protocol

Legislation on soil protection often faces difficulties; some of the reasons have been described above. So what is the “recipe of success” of the Soil Conservation Protocol of the Alpine Convention? The following outline briefly sets out why the contracting parties were able to arrive at a compromise on this international treaty:

➤ Homogeneity of the application area

The uniform conditions within its area of application are undoubtedly a fact which contributed to the conclusion of the Soil Conservation Protocol. The Alps extend over the territories of Austria, France, Germany, Italy, Liechtenstein, Monaco, Slovenia and Switzerland. However, geographically and with regard to environmental circumstances, soils within this vast area are exposed to similar risks, i.e. for instance,

- erosion due to mass slides, mudslides, landslides, avalanches and floods,
- instability of soils as a consequence of global warming and thawing of permafrost,
- soil formation as well as the regeneration of impaired soils happen very slowly,
- continuing soil sealing and soil consumption which, for instance, increase the risk of flood since retention areas are lacking,
- land shortage because almost only the valley floors are suitable for living and economic purposes,
- soil compaction as a consequence of touristic usage of soils, for instance, the levelling of ski runs.

In contrast, legislation on soil protection within the European Union has to deal with a variety of soils and, consequently, with all sorts of different risks from desertification to restriction of sewage sludge. It has already been pointed out that “soil” is a weak basis as the common denominator for this multitude of different rules.

➤ Awareness of the need to take measure on soil protection

In the late 80s and early 90s of the 20th century, soil protection became a fashion topic of environmental politics. So when the negotiating process on the Soil Conservation Protocol started, all contracting parties – at least implicitly – shared the opinion, that soils have to be legally protected. An undertaking, such as this international treaty, was regarded as a useful supplement to national efforts on soil protection. The leader of the Swiss delegation held in 1995, for instance, that “the conservation of soils as a livelihood resource and a living environment for humans had only been recognised as an important public task ten years ago. The Soil Conservation Protocol, thus, has to be considered as a thoroughly

³⁶ See art. 5, 7 para. 1 and 15 First Draft.

³⁷ See art. 6, 7 para. 2 and 10 para. 2 Final Draft.

positive means to increase the awareness and to coordinate actions between the Alpine states.”³⁸

➤ Reception of the Soil Conservation Protocol

It comes as no surprise that legal authorities and political actors of the contracting parties have received this treaty with some reservations from the beginning. It was widely regarded as an instrument of information policy, as a tool to coordinate actions on soil protection and to cooperate between the Alpine states.

It is significant that most of the legislators of the contracting parties have stressed during the ratification process that changes of national law do not go along with the approval of the treaty: “The key objectives have already been taken into account by national legislators and authorities.”³⁹ “There is no need to implement the rules of the Protocols by federal or provincial law since corresponding provisions of national law are already in force. The protocols are mainly being implemented by political programmes.”⁴⁰ “None of the provisions of the Protocols is directly applicable and, thus, they do not directly influence the national laws.”⁴¹ These statements illustrate that the Soil Conservation Protocol and the other Protocols of the Alpine Convention have not been acknowledged as so-called “black letter law”, but rather as a policy document in order to show good will in the field of soil protection.

However, signing a treaty under these circumstances and based on such a reception was a Pyrrhic victory. Since their coming into force as legal documents, the Alpine Convention and its Protocols fight for recognition by the courts. Apart from Austria, national authorities have not effectively based their decisions on the treaties and it is not foreseeable that things are changing soon.

➤ Content

Provisions in international treaties are usually divided into directly and indirectly applicable regulations. The effects of the former on the national legal systems are usually regarded as more severe since these articles and paragraphs have to be applied by administrative authorities and courts in the same way as Acts of the national parliaments. In contrast, indirectly applicable law in international treaties is either addressed to the legislators who have to implement it before it is applied by authorities or, when such provisions are couched in too general terms, they are (only) taken into account as aid to construction of national law.

Only some articles in the Soil Conservation Protocol can be identified as undoubtedly directly applicable. These are clear prohibition clauses: “The Contracting Parties undertake to preserve high moors and lowland moors” (art. 9 para. 1). Mountain forests which offer a high degree of protection to their own location or, above all, to human settlements, transport infrastructures, croplands and similar areas “shall be preserved in

³⁸ Explanatory note relating to the Soil Conservation Protocol of the Alpine Convention, Zi/En/26.04.95 (unpublished).

³⁹ Explanatory note of the Austrian Parliament relating to the Soil Conservation Protocol, 1096 BlgNR 21. GP 32.

⁴⁰ Explanatory note of the German Bundestag relating to the Soil Conservation Protocol, BR-Drs 224/02, p. 6.

⁴¹ Report of the French National Assembly, 2 June 2004, N° 1634, p. 11.

their original locations” (art. 13 para. 1). Permits for the construction and levelling of ski runs “are not granted for fragile areas” (art. 14 para. 1).

Besides, the Soil Conservation Protocol includes many provisions which formulate objectives and which are, thus, target-oriented. The ecological functions of soil “shall be safeguarded and preserved both qualitatively and quantitatively on a long-term basis” (art. 1 para. 2). “The measures to be taken are aimed specifically at soil utilisation which suits its location, at the economical use of land resources, at the avoidance of erosion and detrimental changes to the soil structure, and at minimising the input of substances harmful to the soil” (art. 1 para. 3). The use of peat “shall be discontinued completely in the medium term” (art. 9 para. 1).

Such objectives in legal provision have to be placed in relation to the issue which is regulated. Due to the multifunctional role of soil, many policies are involved and conflicts of interest are unavoidable. In response to such a situation, legislators help themselves by introducing “balancing-clauses” according to which authorities have to set contrary interests in relation in order to decide which particular interest is prevailing in the specific case. Objectives laid down in legal acts have to be considered in such decisions requiring the weighing of interests. As a consequence, such balancing-clauses leave administrative authorities and courts a wide margin of appreciation since the process of balancing almost always includes a subjective element. Controversial objectives, thus, can easily be bypassed when this way of applying legal provisions is prescribed.

That means in particular with regard to the Soil Conservation Protocol, that, in effect, the contracting parties had to exceed a low threshold when signing a contract which includes to large extent target-oriented provisions. The risk of considerable impact on the national legal systems was low.

➤ Ineffective compliance mechanism

A traditional handicap of international law is the lack or at least the weakness of a legal enforcement regime. Although the breach of international law is illegal, non-compliance is usually (only) subject to political sanctions, for instance, in the form of “naming and shaming”.

As a consequence, modern international treaties enforce compliance regimes in order to increase their effectiveness and the culture of compliance. A good example is the Aarhus-Convention and its Compliance Committee (ACCC): The body consists of eight elected members who shall serve in their personal capacity;⁴² thus, it is not a mere political institution. Its rulings – although not legally binding – have turned out to be valuable from the content point of view and have, consequently, already been cited by national courts in order to support their decisions with further legal arguments.⁴³

The legal regime of the Alpine Convention has also enforced a compliance mechanism. The Compliance Committee – a body constituted of a maximum of two representatives per contracting party of the Alpine Convention – controls, if the obligations resulting from the Convention and its Protocols are complied with. However, although the institution is

⁴² *Decision I/7 on review of compliance, 2.4.2004*, ECE/MP.PP/2/Add.8.

⁴³ See e.g. the judgement of the German Administrative Court (BVerwG) 5.9.2013, 7 C 21.12 (ECLI:DE:BVerwG:2013:050913U7C21.12.0); also see *Alge*, Aarhus-Entscheidung: Österreich unter Handlungsdruck, *Recht der Umwelt* 2012, 109.

committed to elaborating the Convention and its Protocols,⁴⁴ its visibility seems to have suffered from the profile it was given and its closeness to politics. Decisions are reached on very rare occasions and they are of little significance for the understanding of the Protocols.⁴⁵ Thus, the effectiveness of the compliance mechanism of the Alpine Convention is very low which also might have been a reason why approval of the Soil Conservation Protocol was not too difficult. In contrast to that, soil legislation on European level is backed up by the jurisprudence of the European Court of Justice which is known to be “dynamic” and sometimes unpredictable.

➤ Limited relevance of competence matters

Finally and in accordance with statements which have already been made, negotiating on the Soil Conservation Protocol did not raise particular questions of competence. The division of powers under national law is not an issue of international law which is in this respect blind to national requirements. The Alpine states did not transfer competences to another institution; they acted as legislators themselves and of their own free will. If, as it is the case in Austria, treaty-making powers are more or less centralised, the signing and ratification of an international treaty, then, go hand in hand.

In contrast, the example of Switzerland shows that questions which arise out of a national legal system can still play a role in the ratification process of an international treaty. The developed separation of federal, cantonal and municipal powers and the fear of losing legal capacity by accepting an international treaty are interrelated reasons of why none of the Protocols has been ratified by Switzerland yet.

V. Concluding remarks

When the Soil Conservation Protocol was signed in 1998, it represented “cutting-edge” legislation on soil protection. However, agreement was achieved, on the one hand, because controversial issues had been omitted, and, on the other hand, because of the specific structure of the Protocol which, for instance, contains many target-related provisions and which is not subject to an effective compliance mechanism. Both of which have been important precondition for the signing of the treaty.

When reflecting on the Soil Conservation Protocol and on the question, what lesson can be drawn from it for European legislation on soil protection, a somehow sobering conclusion must be drawn. In analysing the “success” of the Soil Conservation Protocol, both sides of the coin have to be taken into account: a successful compromise at the price of reduced legal force and of contents which are watered down.

⁴⁴ See the record of decisions and recommendations at www.alpconv.org (20.6.2016).

⁴⁵ See the decision of the Compliance Committee on art. 6 para. 3 Tourism Protocol, ImplAlp/2014/20/6a/3, published at www.alpconv.org (20.6.2016).