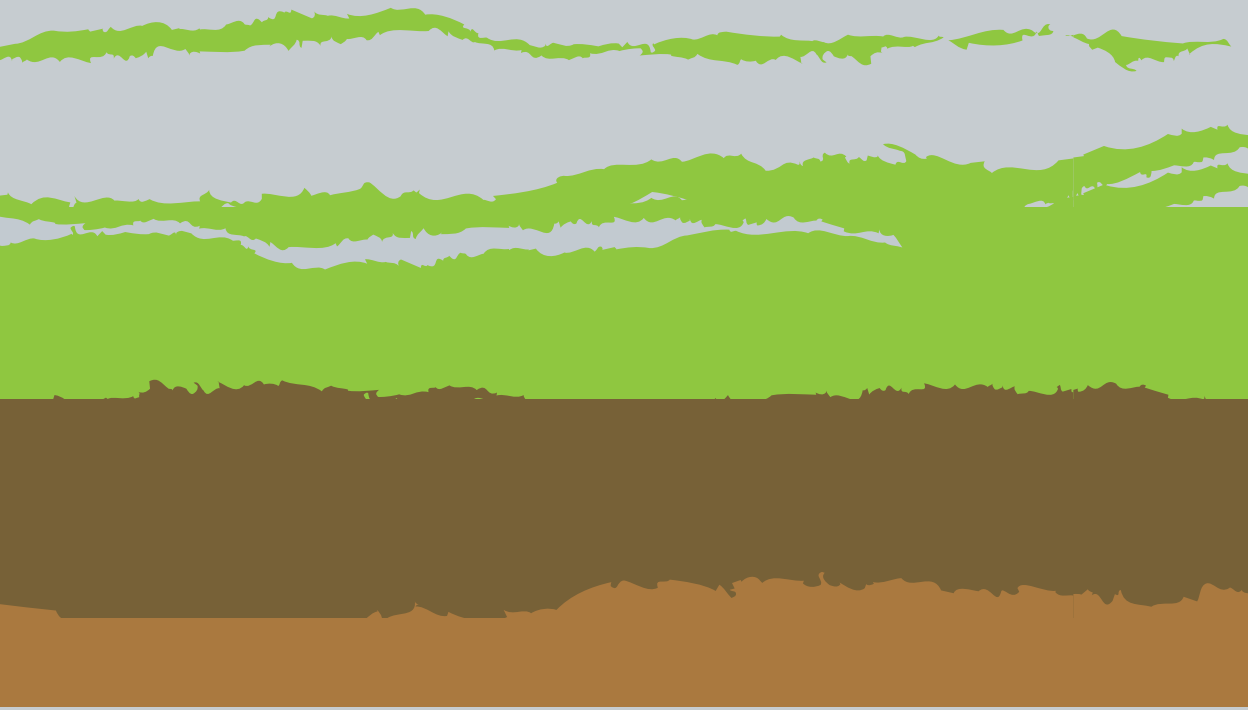
Soil management practices in the Alps

A selection of good practices - Case Study 7



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Interreg Alpine Space
EUROPEAN UNION
Links4Soils
EUROPEAN REGIONAL DEVELOPMENT FUND

Excerpt from
SOIL MANAGEMENT PRACTICES IN THE ALPS
A selection of good practices for the sustainable soil management in the Alps

Project and funding
Links4Soils project (ASP399);
EU Interreg Alpine Space

WP, Deliverable
WPT3 (D.T3.5.3)

WP Lead / Publisher
Slovenia Forest Service
(Zavod za gozdove Slovenije)

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Acknowledgments
Special thanks to Mr Thomas Peham, a Links4Soils project partner and member of the EUSALP Action Group 6, who provided several best-case practices.

Layout
Alenka Šubic

Place and date
Ljubljana, April 2020

URL
https://www.alpine-space.eu/projects/links4soils/en/

Free copy

Kataložni zapis o publikaciji (CIP) pripravili v Narodni in univerzitetni knjižnici v Ljubljani

COBISS.SI-ID=305185024

ISBN 978-961-6605-41-0 (pdf)

Interreg Alpine Space
EUROPEAN UNION
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ZAVOD za GOZDOVE SLOVENIJE
Slovenia Forest Service

CS7.

Soil protection on construction sites in Switzerland

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Country, Region:	*Switzerland*
Organisation:	*Soil Science Society of Switzerland*
Sector:	*construction*
Land uses:	*various (e.g. agriculture, urban)*
Main soil threat:	*erosion, organic matter decline, compaction, sealing, contamination, nutrient depletion, loss of soil biodiversity*
Key soil ecosystem services:	*No focus on single services. All potential services will be considered.*
Summary:	*Since construction works negatively impact the soils directly within the construction zone, as well as the soils in its surroundings, e.g. through compaction, it is essential to consult a pedologist for all major construction projects. The soil expert is involved during the planning, execution and restoration phases and consults the builder with a comprehensive soil protection concept. In this way, the negative impacts on soils can be minimised in order to secure vital soil-based ecosystem services. The practice is standard in Switzerland, but can easily be transferred to other areas within or outside the Alps.*
Keywords:	*pedological consulting in construction projects, Switzerland, soil protection in construction*

Background and description of the problem

Heavy machinery is used wherever construction works take place and, consequently, soil is disturbed. Sustainable management during construction requires well-prepared professionals in order to avoid damage to soils and to maintain soil fertility. For several years, it has been obligatory to consult a soil expert at large construction sites. Qualified experts are responsible for advising and assisting with soil protection measures. In smaller construction projects, soil protection consulting and measures are often the responsibility of project planning and management professionals, who are not always aware of the importance of soil.

Expected improvements / contribution to better soil management

The Alpine environment is under increasing pressure due to the enhanced construction activities. Different sites illustrate that destructive construction methods lead to long-term reduction of soil quality. Therefore, preventive and protective methods are extremely important. The Soil Science Society of Switzerland found that a pedological consultation during construction projects has become a successful and effective instrument for chemical and physical soil protection since its introduction in 2001

Stakeholders and target groups

Target groups include the building companies operating in all bigger constructions. Stakeholders are the architects, planners, construction workers and experts for environmental and soil protection on construction projects.

Data and methods

In Switzerland, the data availability for the work of Soil Protection Experts for Construction Projects (SPECPs) is rather limited. While large-scale maps of geological and hydrogeological information are usually available, spatial information on vegetation or protected areas is quite scarce. Since detailed soil maps are normally not available, SPECPs have to excavate soil profiles and or mini pits or have to take soil core samples in order to obtain information about soils.

An example for a construction site with pedological consulting includes the enlargement and construction of a partly new route of the Julier pass, which was carried out between the years 2008 and 2013. It included new embankments, road dismantling, protection dams against avalanches and renaturations of river banks and resulted in the relocation of 230,000 m^3 of material and affected an area of over 18 ha. Based on point-based soil samples and vegetation maps, the SPECP and the Environmental Protection Expert for Construction Projects (EPECP) elaborated a soil protection concept – covering planning, construction and restoration phases – taking into account the available and newly gathered information. At Julier Pass, the soil depth varied from very shallow to up to 1 m. The heterogeneity of the soils and developed ecosystems required an interdisciplinary approach and specific measures in order to protect the complex environmental conditions. Direct displacement, where the soil is moved together with turf grass, was carried out to restore the original landscape.

Results

The practice is ongoing and is carried out under the management of the Federal Office for the Environment of Switzerland (FOEN).

The Swiss Soil Science Society found that pedological consultation in construction projects has become a successful and effective instrument for chemical and physical soil protection since its introduction in 2001. In Switzerland, the urge for protection of soil is widely recognised. However, the SPECP would often need more detailed spatial soil information requiring further soil surveys, in particular in mountainous areas.

Transferability and applicability to best soil management practice

This approach to protection of soil at construction sites is easily transferable to other regions and countries, and it is also highly sensible to transfer it. For example, in Germany, the organisation “Bundesverband Boden e.V.” now also recommends involving soil experts at construction sites similarly to Switzerland. See: www.bodenwelten.de/content/bodenkundliche-baubegleitung (only available in German).

Environmental and climate change impact

For adaptation and mitigation of climate change, soils are a key factor as they store and can potentially act as sinks for huge amounts of carbon. Soils can be damaged (compaction/mineralisation) by unsuitable management practices and their soil-based ecosystem services can be lost. Therefore, soil protection at construction sites is a great asset to maintain healthy soils.

Photos / illustrations / maps

Figure 28: A negative example for soil excavation: No separation of turf, the high thickness of topsoil deposit and driving on deposit with heavy machinery *(Photo: Thomas Peham).*

Figure 29: A positive example of soil treatment: The loosening of compacted soil followed by filling of underground and top soil in layers *(Photo: Thomas Peham).*

References and further reading

Soil Science Society of Switzerland – List of experts: http://www.soil.ch/cms/bbb/bbb-liste/

Soil Science Society of Switzerland – Bodenkundliche Baubegleitung (pedological consulting in construction projects): http://www.soil.ch/cms/bodenkundliche-baubegleitung/

Federal Office for the Environment (FOEN): https://www.bafu.admin.ch/bafu/en/home/topics/soil/info-specialists/soil-protection-measures.html

Clemens Geitner; Jasmin Baruck; Michele Freppaz; Danilo Godone; Sven Grashey-Jansen; Fabian E Gruber; Kati Heinrich; Andreas Papritz; Alois Simon; Silvia Stanchi; Robert Traidl; Nina von Albertini; Borut Vrščaj (2017). "Soil and land use in the Alps – challenges and examples of soil survey and soil data use to support sustainable development". Soil Mapping and Process Modelling for Sustainable Land Use Management. 225-296.

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