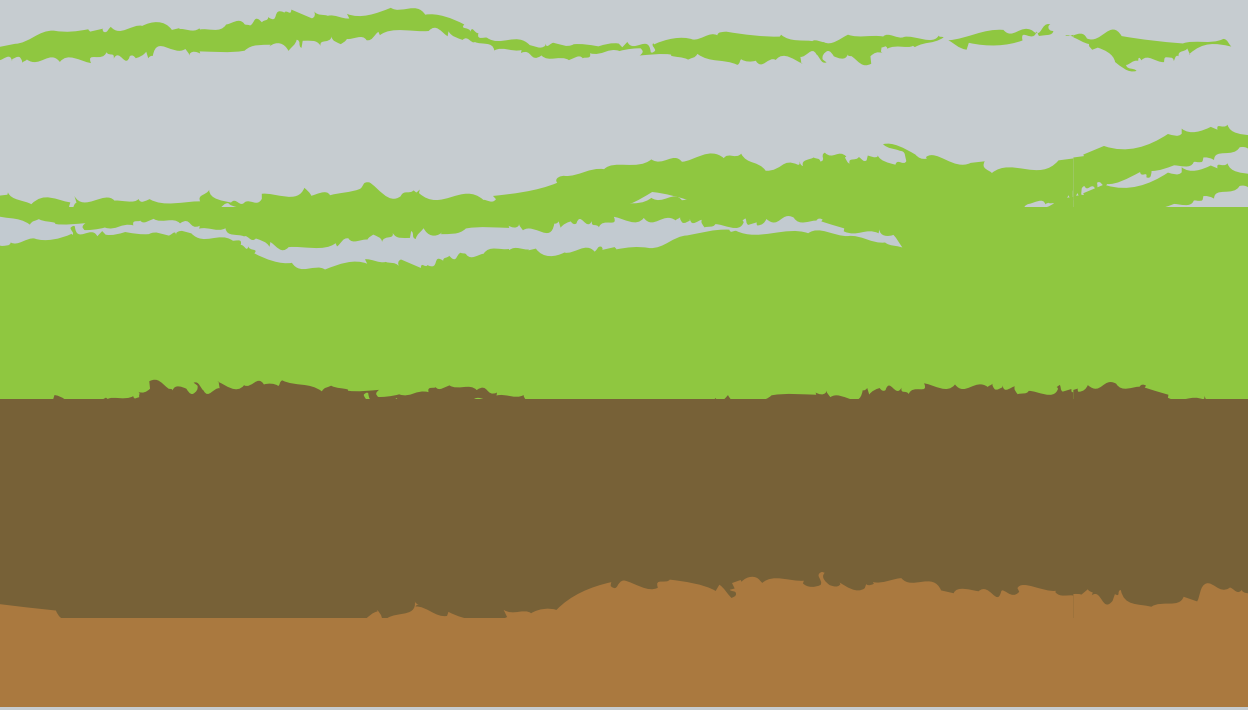
Soil management practices in the Alps

A selection of good practices - Case Study 12



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CS12.

Austria CO_2- Recycling; Climate Change Mitigation by means of Soil, Humus and Habitat Management – a Demonstration Project Report

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Country, Region:	*Austria, Südkärnten*
Organisation:	*Regional Management South Carinthia (project execution organisation)*
Sector:	*agriculture and waste management*
Land uses:	*agricultural land, wetlands*
Main soil threat:	*organic matter decline, loss of soil biodiversity*
Key soil ecosystem services:	*erosion regulation, biodiversity, carbon sequestration*
Summary:	*Intensive farming leads to a permanent loss of soil organic matter (SOM), particularly in cropland and moors, where the humus' ability to stabilise the landscape water regime, improve biodiversity, and store CO_2 is of the utmost importance. To counteract SOM depletion, this pilot project was aimed at fostering the building of capacities among farmers and municipalities in the Carinthian region via activities connected with waste management, humus formation on cropland, and moor management. Awareness-raising activities in schools contributed to additional multigeneration transfer of knowledge.*
Keywords:	*carbon sequestration, regional carbon circle, Südkärnten (South Carinthia)*

Background and description of the problem

About 30–40% of worldwide greenhouse gas emissions are caused by land use and land use change. Apart from livestock farming, the moor degradation and loss of humus on cropland are the main CO_2 polluters in this sector in highly industrialised countries. For example, in Germany, drainage and intensive use of moors are responsible for about 5% of total CO_2-emissions. Intensive conventional farming leads to a permanent loss of SOM, in particular on cropland. Degraded moors and cropland soils with low humus content are not able to sufficiently stabilise landscape water regime. Negative impacts of droughts and heavy rain-induced torrents and erosion are dramatically increasing. Studies (Höper, 2007; Bundesamt für Naturschutz 2013) proved that drained and intensively used moors cause up to

40 t CO_2/y/ha. Composting organic materials, e.g. greenery from private gardens and municipalities, is not very common in South Carinthia. Unfortunately, organic waste from households is predominantly illegally deposited in landfills in the woods.

To solve these problems, the project aimed to demonstrate the best waste management practice in terms of:

- Closing the carbon cycle by composting the organic matter and using the compost for humus formation on cropland, and
- Sustainable moor management and moor regeneration.

Expected improvements / contribution to better soil management

Environmental benefits for the area and the people:

Better moor management and regeneration of moors contribute to:

- A stabilised water regime
- Reduced carbon emission due to moor degeneration, and
- Improved biodiversity.

Composting organic materials from private gardens and public green areas by farmers that use the produced compost for humus formation on their agriculture land:

- Is considered a cornerstone of closing the regional carbon cycle,
- Sequestrates CO_2 and helps to stabilise the water balance,
- Improves and preserves natural fertility of agricultural soils and
- Creates new job opportunities for farmers.

The project was only able to foster pilot actions and disseminate knowledge to farmers regarding sustainable moor management, humus management on cropland and household organic waste composting.

The project motivated farmers and municipalities in South Carinthia and, in particular, members of climate and energy model regions to start additional composting and C-cycle related projects.

It is planned to give a new boost to this idea by establishing a regional carbon trade system like the one that was started by Ökoregion Kaindorf in Styria several years ago.

Stakeholders and knowledge transfer

Three different modules that follow specific stakeholders and target groups were identified and involved into the knowledge transfer activities:

- The Waste Management Module that focuses on composting organic materials of the municipalities: it integrates interested farmers, administration of the municipalities, and general public/citizens.
- The Humus Formation on Cropland module was well received by regional farmers, Bio Austria Kärnten, an organic farmers association, and the Climate Alliance Austria, an important Austrian non-governmental organisation.
- The Pilot Actions Moor Management module has proven valuable to the Arge NATUSCHUTZ (nature conservation organisation), as well as land owners.
- Awareness rising in schools, including presentations in two secondary schools.

Data and methods

1. Feasibility study regarding composting municipal organic waste
The estimation of the amount of organic waste was based on experience gathered across Austria and the information that was provided by the municipalities.

2. Humus formation on cropland
Several experts for careful soil cultivation were involved.

3. Pilot actions moor management
To identify suitable moor habitats for management measures, available habitat maps were evaluated. However, degraded and drained moors that are intensively used for agriculture are not included, therefore the underlying data for these sites were scarce.

The activities in 4 project modules:

1. Waste management

- Feasibility study regarding composting of organic materials by farmers in South Carinthia (8 municipalities). The study estimated the total amount of organic waste in the region, proposed suitable sites for compost plants and identified farmers that showed strong interest.

2. Humus formation on cropland

- Demonstration project regarding humus formation on one hectare of cropland carried out by Goldbrunnhof professional school for farming in Völkermarkt.
- Humus formation workshop for farmers at Goldbrunnhof was organised.

3. Pilot actions moor management

- 4 practical habitat management measures have been carried out.

4. Awareness rising in schools

- Excursions for students to the moors in the region.
- 2 workshops in schools on the topic of soil and climate change including building a compost pile.

Duration: June 2012 – January 2014

Results

The strategy of the project was to involve the relevant target groups into activities of each project module.

1. Waste management
The Feasibility study regarding composting of organic materials by farmers in South Carinthia was elaborated in close connection with the municipalities. Additionally, interested farmers were interviewed about their ideas and wishes regarding composting organic materials for the municipalities. At the end, the results of the feasibility study were presented to the mayors and heads of office of the municipalities.

2. Humus formation on cropland
Humus formation demonstration project on one hectare of cropland was carried out by Goldbrunnhof Professional School for Farming in Völkermarkt. The students were responsible for the activities of this module under supervision of their professors. The brochure "Climate Protection and Climate Adaptation in Agriculture" was published and co-financed by Bio Austria Kärnten. One of the chapters includes the results of the humus formation pilot action of Goldbrunnhof.

3. Pilot action moor management
Practical habitat management measures have been carried out. E.g. landowners were paid to remove tree and shrub cover from their moor.

4. Awareness rising regarding soil in schools

- excursions for students to the moors in the region
- compost-preparation workshops that included the topic "soil and climate change" were organised in two secondary schools.

All outcomes of the project were summarised in a project booklet. Several local newspapers reported on the entire project or about some special activities. The project won the Energy Globe Award of Carinthia in the "air" category and was nominated for the Austrian Energy Global Award.

Transferability and applicability to best soil management practice

The project has produced knowledge and know-how on humus management that is transferable virtually to any rural area apart from farmland at higher altitudes.

Humus formation is most effective on cropland. For that reason, the proportion of cropland compared to the entire agricultural land should be high. This is the most important pre-condition for a successful transfer of this activity. Generally, it is challenging to get conventional farmers interested in innovations. For that reason it brings a great advantage if some farmers in the project region already practice soil protective measures (e.g. farmers who practice less till farming or organic farmers) because normally farmers are more open to learning from other farmers who live in the neighbourhood and are often not receptive to guidance from external experts.

In many rural areas in Austria, establishing composting of municipal organic waste by farmers is difficult and requires use of state-of-the-art equipment. In some regions in Austria, organic waste composting is centralised in large technical plants that are not suitable for small scale decentralised composting by farmers as was demonstrated in the project. Such areas may exist in other Alpine countries as well.

Environmental and climate change impact

The demonstration of soil related CO_2 reduction measures was the main target of the project. The key focus of the project was to demonstrate humus formation on cropland by using the compost from municipal organic waste as a carbon source, and, in this way to utilise soil as a carbon sink.

Additionally, reducing CO_2 emission from degraded moors was another important activity aiming to combat climate change.

Photos / illustrations / maps

Figure 43: Typical intensively prepared arable land with low humus content. The soil has formed a crust.

Figure 44: Land on moor site (drained). This soil emits up to 40 t CO_2 per hectare and year.

Figure 45: No till organic arable land with permanent green cover. Conservation tillage and promotion of soil life is crucial for successful humus formation.

Figure 46: Humus formation workshop for local farmers at Goldbrunnhof professional school for farming in Völkermarkt.

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