SoilCare

SOILCARE FOR PROFITABLE AND SUSTAINABLE CROP PRODUCTION IN EUROPE

Factsheet #5: SOIL IMPROVING CROPPING SYSTEMS FOR PREVENTING LANDSLIDES

THE PROBLEM

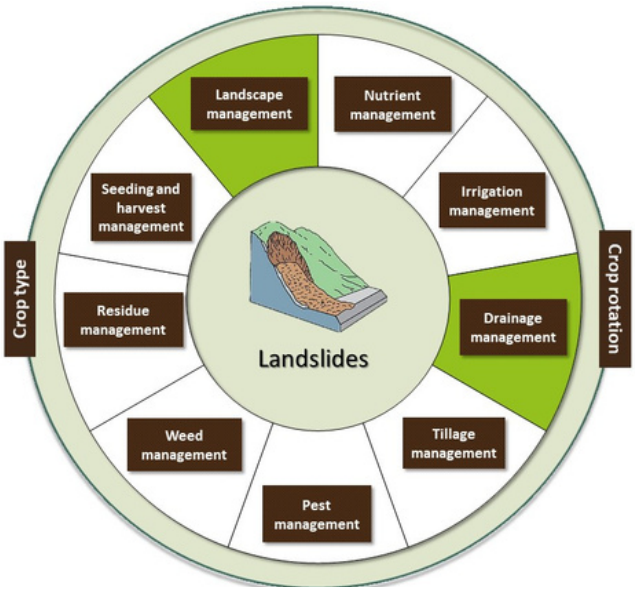
Landslides occur where disturbances affect the stability of a slope. Certain agricultural practices increase the likelihood of landslides, including planting inappropriate crops (e.g., late harvested crops such as maize on sloping land) and trafficking land during wet weather.

HOW CAN SOIL-IMPROVING CROPPING SYSTEMS PREVENT LANDSLIDES?

Soil improving cropping systems (SICs) are specific combinations of (1) crop types, (2) crop rotations and (3) management techniques aimed at halting soil degradation and/or improving soil quality and at the same time having positive impacts on profitability and sustainability. They need to be suited individually to each farm's local environment. The key principles are:

- Maintaining ground cover
- Decreasing or slowing down the run-off of water
- Decreasing the wind speed at the soil surface

SICs component	Basic principle
Long/diverse crop rotations	Adds soil structure & organic matter for water absorption & retention
Smart irrigation	Saves water as applied when most needed
Minimum tillage	Improves soil biodiversity & structure
Vegetative strips, hedges, agroforestry	Reduces wind speed, helps soil absorb excess water, improves soil structure
Crop residues & mulches	Adds organic matter for water absorption & retention
Stony soils	Reduces wind speed & runoff



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The SoilCare project is funded by the European Union's Horizon 2020 research and innovation programme under grant agreement No. 677407.

DRAINAGE MANAGEMENT

Managing drainage appropriately can ...

CLAND DRAINS

The crop choice in a rotation is important. Some crops are inherently more sensitive to erosion than others, especially row crops and crops that have poor cover during the most erosive period of the year, such as maize that is grown on slopes. From the viewpoint of erosion control, crops should be chosen that quickly produce significant ground cover.

COVER CROPS

Cover crops are grown to provide vegetative cover between rows of main crops in orchards and vineyards or between periods of regular production to prevent erosion. Some cover crops such as alfalfa and clover also replenish the nitrogen supply of the soil. Cover crops used should be established easily, provide quick ground cover and eliminate other vegetation. Which species is most suitable depends on local conditions such as climate, soil and farming system. For water erosion, short cover is preferable, while for wind erosion high cover is better.

FALLOW CROPS

Fallow crops can allow the soil to recuperate if the fallow period is long enough. On soils with very poor structural stability, consider moving towards ley-arable rotations.

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LANDSCAPE MANAGEMENT

Landscape management provides a holistic view of SICs and helps to integrate a number of larger components across the farm. This includes trees and shrubs as well as strips of perennials or alternative crops through fields. Creating continuity throughout the farm further help mitigate erosion and run-off.

TREE PLANTING

Trees, where planted and managed appropriately, can help improve soil structure and prevent erosion, thus reducing the risk of landslide.

TREES CAN PREVENT LANDSLIDES

HEDGES

These managed trees or shrubs help to slow wind at field boundaries and add organic matter to reduce erosion.

STRIP CROPPING

Strips of low and high cover crops (e.g. clover and wheat). These reduce the rate of sediment movement down the slope, where deposition high on the slope is more beneficial than lower down. On steep slopes or if there is no alternative method of preventing erosion, planting fields in long strips alternated in a crop rotation system (strip farming) has proven effective.

TERRACING

Many farmers have successfully combated erosion by planting in flat areas created on hillsides in a step-like formation (terrace farming).

TERRACING

HEDGEROW

STRIP CROPPING

SHELTERBELTS

Rows of trees are placed at right angles towards the main wind direction. Grids of shelterbelts are good for variable winds. The belt is dense enough to result in a large decrease of wind speed, but not so dense that air cannot move through it. Windbreak effectiveness extends as far leeward as 15 to 20 times the height of the windbreak, and windward for about twice its height.

GRASS STRIPS

Perennial strips are planted between crops which are not cultivated. These areas act like strip crops (left) and maintain undisturbed soil biodiversity and organic matter.

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