



SoilCare

SOILCARE FOR PROFITABLE AND SUSTAINABLE
CROP PRODUCTION IN EUROPE

Factsheet #2: SOIL IMPROVING CROPPING SYSTEMS FOR FLOODING



THE PROBLEM

Flooding occurs where watercourses become overwhelmed with water or where water tables are over-saturated. Alongside resulting in bodies of water on land, flooding can also result in the deposition sediment onto the land surface as well as water. Flooding has become prevalent across Europe in recent years and has a detrimental impact on crop yields, soil structure, and runoff.



HOW CAN SOIL-IMPROVING CROPPING SYSTEMS PREVENT & REMEDIATE FLOODING?

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

Minimum
tillage

Improves soil biodiversity &
structure

Vegetative
strips, hedges,
agroforestry

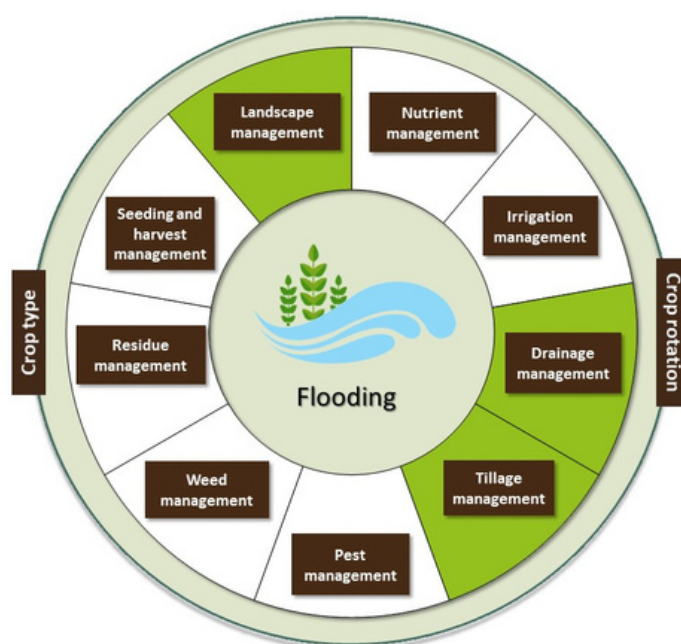
Helps soil absorb excess
water, improves soil
structure

Crop residues
& mulches

Adds organic matter for
water absorption &
retention

Land drainage

Enables water flow



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Tillage management is another essential SICs tool which can prevent and help remediate flooding through preventing compaction and by building organic matter which is useful for water retention.

CONSERVATION TILLAGE

This can include no-tillage, reduced-tillage, ridge-furrow systems, hillocks and mulch tillage. Studies suggest that conservation tillage can reduce yields but this varies strongly on crop type, tillage technique, soil texture and crop rotation.

CONTOUR TILLAGE

Planting in rows that run laterally around a hill have been shown to reduce runoff and decrease the risk of water erosion. To prevent erosion in places where water concentrates grassed waterways can be used.



TRADITIONAL PLOUGHING



NO-TILL (DIRECT DRILLING)

PHOTO: FARMERS GUIDE

DRAINAGE MANAGEMENT

Well managed field drainage and soil management reduces flood risk and decreases surface runoff of pollutants.

FIELD DRAINAGE

Good field drainage reduces the peak surface water run-off rates by increasing the availability of storm-water storage within the soil. Rainfall can then percolate through the soil into the drains, producing a more balanced flow after storms. This reduces flood risk both on-farm and downstream.

DRAINAGE DITCHES

Well managed drainage ditches (i.e., not saturated with sediment, with clear outfalls) can reduce flood risk on-farm. Cross compliance regulations require farmers to manage their drainage ditches and have buffer strips adjacent to them.



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 these features which increase water retention throughout the farm further help mitigate flooding and run-off.

TREE AND HEDGEROW PLANTING

Trees can be grown in strips between crops, around fields or scattered within fields, whilst hedgerows can be grown between field boundaries. These can reduce flood risk by intercepting rainfall, improving soil structure, absorbing water, and increasing water retention.



CONSTRUCTED WETLAND

NATURAL FLOOD MANAGEMENT

Natural flood management measures are designed to reduce flood risk on-farm by using 'natural' approaches rather than engineered. These include woody debris barriers, ponds, buffer strips, and planting flood resistant crops.

WOODY DEBRIS BARRIERS

Woody debris barriers help to slow the flow of water as woody vegetation is placed within a watercourse to prevent water from moving too quickly downstream which can result in flash flooding.

PONDS/FLOODPLAINS

Ponds/temporary floodplains can be installed in appropriate areas to store water, thus preventing flooding on productive land.

BUFFER STRIPS

Buffer strips are areas which are taken out of production and instead planted with diverse vegetation which can maintain undisturbed soil biodiversity and organic matter and prevent flooding and runoff where they are planted adjacent to watercourses.

FLOOD RESISTANT CROPS

Deep rooting cover crops can prevent flooding by improving soil structure and by providing soil with overwinter cover. In addition, avoiding certain crops which are harvested later in the year (e.g., maize) can also reduce flood risk on-farm.



COVER CROPS



HEDGEROW



BUFFER STRIP