

THE PROBLEM

Water logging can result in the soil becoming saturated, either due to flooding or by the water table reaching the soil surface. Most crops require a soil with at least 10 to 15% volume of air-filled and connected pores. Water logging replaces the air with water, which hampers aeration of the root zone for cropping systems, leading to anoxic conditions for the roots.



How does waterlogging affect soil functions?

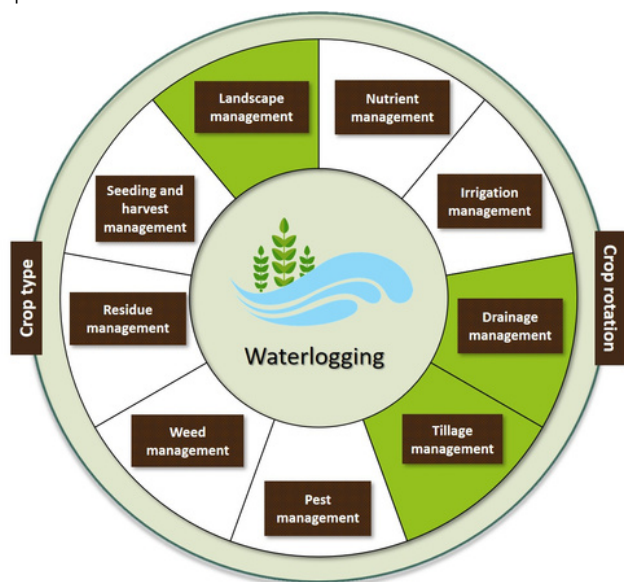
- Reduced productivity as crops become stressed, reducing development and growth.
- Severe water logging leads to leaf yellowing, wilting, senescence, root and tuber rotting.
- Decline in the soil macro pores and soil biodiversity that create a soil's structure, making the soil more susceptible to compaction, crusting, and high bulk-density problems

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

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.

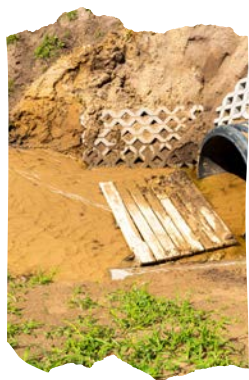
The key principles for remediating water logging are:

- Preventing water logging by removing excess water or lowering the groundwater table
- Improving the structure and water infiltration capacity of the soil



SICs component	Basic principle
Drainage management	Prevents waterlogging by removing excess water or lowering the water table
Landscape management	
Tillage management	Improves soil structure and water infiltration capacity

DRAINAGE MANAGEMENT



Drainage management can either prevent or mitigate the effects of water logging either through surface drainage (by mole drainage, raised beds) or subsurface drainage (by tile or ditches).

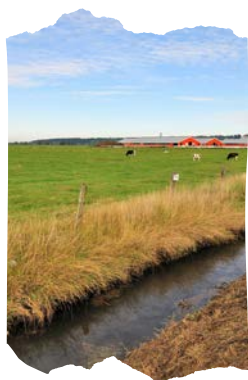
Surface drainage aims to create a drier root zone by removing the surface water which fails to infiltrate the soil, while the subsurface methods aim to lower the groundwater table, so that capillary rise will not reach the root zone in such a way that sufficient airspace in the root zone allows aerobic conditions.

TILLAGE MANAGEMENT



Improving the soil structure will increase the water infiltration capacity of the soil, thus reducing the risk of water logging. Soil structure can be improved by minimizing compaction through reduced tillage or zero tillage management systems. Harvesting operations under very wet conditions run the risk of destroying the soil structure by compaction and should be avoided, particularly on soils with sensitive structure, like loamy and clayey soils.

LANDSCAPE MANAGEMENT



Water logging and flooding can be prevented at the landscape scale by retaining water in dedicated areas, such as the creation of water storage buffer zones. Lowering the water table by managing water levels in ditches and rivers can also be effective.

PRIORITY CROP TYPES FOR REMEDIATING POLLUTION



Crops that improve soil structure and the infiltration capacity of the soil can help prevent water logging, including perennials (grasses), cereals like wheat and barley, and alfalfa. Changing land use from crops to pastures is an effective strategy for coping with areas at high risk of water logging.

