

What is subsurface (tile) drainage?

Subsurface drainage is a system of underground pipe designed to remove gravitational water in the upper profile of the soil to prevent saturation.

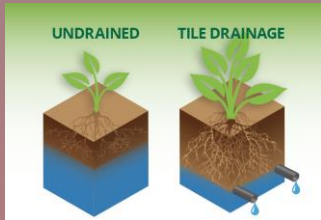


Figure 1. Visual demonstration of tile function [2]

What are the benefits?

- Earlier field access
- Improved soil aeration
- Reduced salinity
- Better resilience to extreme weather
- Less potential for compaction
- More consistent yields

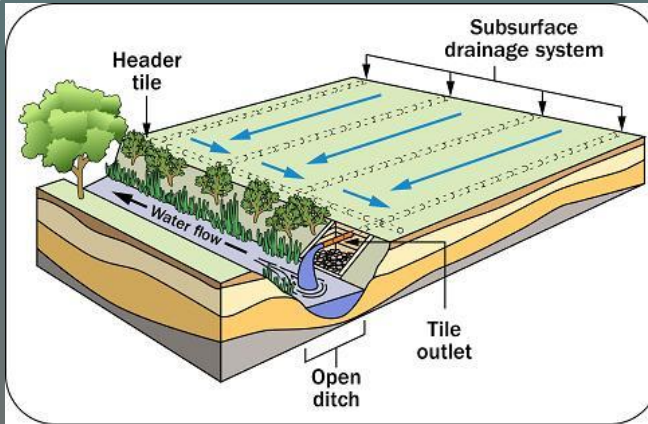


Figure 2. Typical design of a tile drainage system [1]

How are tile systems designed?

- Tile system design is dependent on soil characteristics and how quickly water can percolate through the soil (hydraulic conductivity). Soils with slower percolation rates (clays) require closer tile spacing that those with higher percolation rates (sands) in order to have the same drainage capacity.
- Producers desiring more aggressive drainage systems may opt for closer spacing.
- The optimal system is not one providing the maximum capacity, but one that provides the best return for the cropping system.
- Local regulations may dictate certain aspects of the design.

Why is tile spacing important?

Tile spacing is the main variable that is used to change the capacity of the system, which is defined as the “drainage coefficient” (how much water can the system remove and how quickly?).

What is controlled drainage?

Controlled drainage is the use of structures to control the depth of the water table in the field, and the flow of water out of the field.

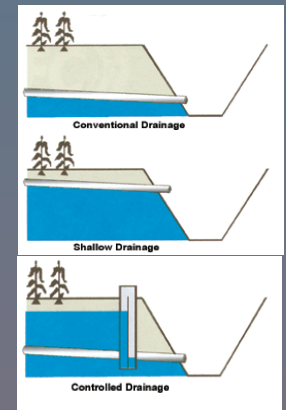


Figure 4. Controlled drainage provides a method to control the water table [1]

“Optimized” Drainage Design

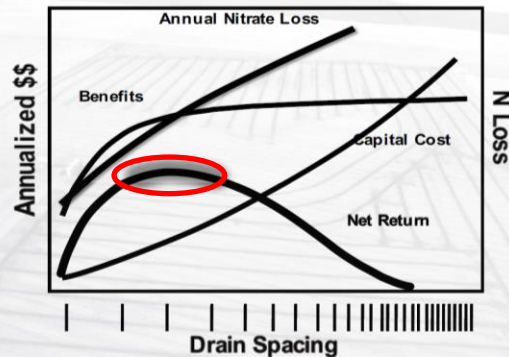


Figure 3. An optimal system provides the maximum economic benefit for the cropping system [2]

References

<http://www.omafra.gov.on.ca/english/engineer/facts/10-091f2.jpg> [1]

Dr. Gary Sands, Extension Drainage Design & Water Management Workshop, (2016) [2]