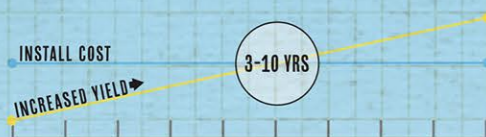


AGRICULTURAL EFFICIENCY & PRODUCTION



RETURN ON INVESTMENT

Drainage systems can return the cost of investment in 3 -10 years¹ and are one of the most effective methods of increasing agricultural efficiency and productivity.

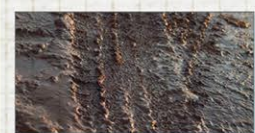
¹Gary R. Sands, University of Minnesota Extension Service, Tile Drainage for Profitable Crop Production, <http://www.smallgrains.org/drainage/FAQ/faq.html>



STANDING WATER

Standing water directly affects yield and interrupts traffic patterns by creating non-uniform field conditions.

TOTAL FIELD ACCESS

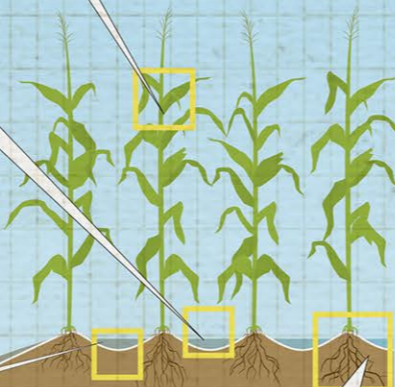


SOIL COMPACTION

Vehicle traffic on wet soil can cause soil compaction, limiting root growth and adding to plant stress.

SEDIMENT

Uncontrolled surface runoff can increase the loss of nutrients and sediment and negatively impact water quality.



SATURATED ROOTS

Over saturated soil condition limits oxygen to the root zone resulting in shallow root growth. Crops with shallow roots are less durable, less productive and have trouble reaching water tables in the dry season.

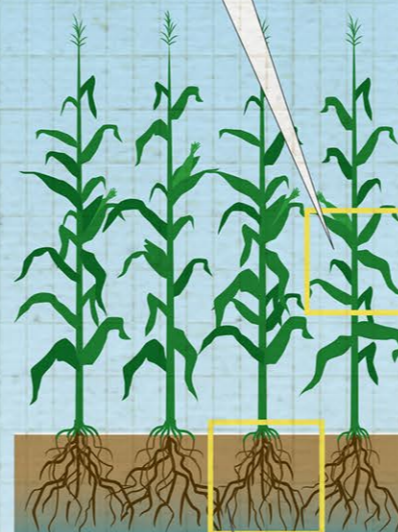
PEAK FLOW RATES

Surface drainage increases peak surface runoff flow rates, which is what causes flooding. Because tile drainage tends to decrease peak runoff rates, it should not increase, and may even decrease, the incidence of flooding.¹

¹Gary R. Sands, University of Minnesota Extension Service, Tile Drainage for Profitable Crop Production, <http://www.smallgrains.org/drainage/FAQ/faq.html>

HIGHER YIELDS

Subsurface drainage systems can significantly improve crop yields on poorly drained soil. Typical increases might be 10-30 bushels/acre for corn and 5-10 bushels/acre for soybeans.¹



HEALTHY ROOTS

Subsurface drainage promotes deeper, healthier root systems by decreasing plant stress and allowing for more oxygen in the root zone.

DEMANDS OF POPULATION GROWTH

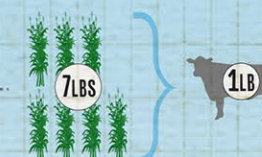
As the global population grows from 7 billion to almost 9 billion by 2040, the demand for resources will rise exponentially. By 2030, the world will need at least 50 percent more food, 45 percent more energy and 30 percent more water.¹

¹United Nations, The Report of the United Nations Secretary-General's High-Level Panel of Experts on Global Sustainability, "Business, Resilient Planet & Future World Choices", <http://www.un.org/apps/news/story.asp?NewsID=46869&Cr=agriculture&Cr2=food>



PROTEIN CONSUMPTION

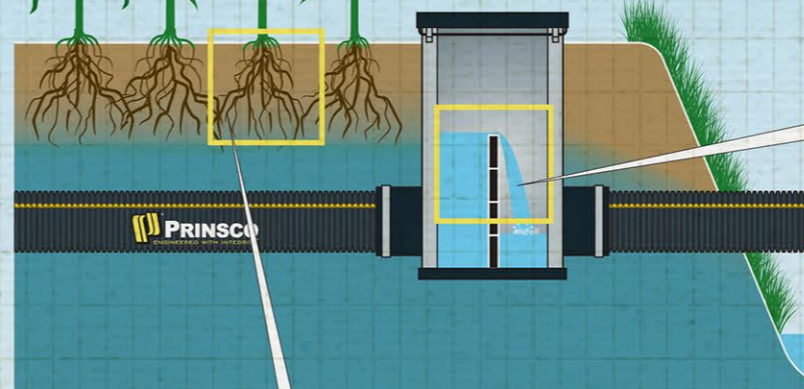
World consumption of animal protein is on the rise, and about 35% of the world's grain harvest is used to produce animal protein. It takes 7 lbs of grain for 1 lb of gain in grain-fed beef.¹



¹Ernest Brinow, "Rising Meat Consumption Takes Big Bite out of Grain Harvest", <http://www.extension.umn.edu/distribution/cropsystems/dc7740.html> (November 2011)

CONTROLLED DRAINAGE

The emerging trend towards controlled drainage allows farmers to manage water tables while reducing nitrate loss.



WATER QUALITY

Subsurface drainage can decrease surface runoff thereby reducing sediment losses by 16-65% and phosphorus losses by up to 45%.¹

¹Lowell Busman and Gary Sands, University of Minnesota Extension, Agricultural Drainage, Issues and Answers, <http://www.extension.umn.edu/distribution/cropsystems/dc7740.html>