

# Envirothon 2017 Current Issue: Agriculture Soil and Water Conservation

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#### Outline:

- Soil Management
- Nutrient Management
- Soil Quality / Soil Health



- Soil Management is best described as the ability of land users to manage the soil for our land uses while also minimizing soil degradation.
- Examples of BMPs for soil management include:
  - Crop rotations
  - Tillage conservation
  - Contour planting
  - Terracing
  - Buffer strips
  - Riparian management
  - Cover and trap crops
  - Residue management



• Crop Rotation:

The practice of growing different types of crops (or none at all) in the same area over a sequence of seasons.

- There are many different rotations:
  - Continuous Potato!
  - Potato Barley
  - Potato Barley underseeded to Red Clover Red Clover
- Simple concept:
  - Longer rotations are better.
  - Diversity is better.
  - Perennial crops are better.
- But we need cash flow so how do we manage our crops to benefit soil quality?

- Roots play an important role:
  - Hold soil in place
  - Contribute organic matter
  - Have exudates which improve soil structure
  - Create channels for water and air to penetrate quickly
  - Improve drainage
- Stems play an important role as well:
  - Trap sediments, reducing movement of particles across the surface of the soil and provide interception for rainfall.





- Why rotate?
  - Better yield (?)
  - Better pest management
  - Diversify cash crops
  - Increase soil organic matter
  - Improve tilth (seedbed)
  - Cover soil
  - Increase biodiversity
  - Augment populations of beneficial organisms
  - Increase plant nutrient cycling
  - Reduce soil erosion
  - Improve water and air movement in soil



## Soil Management: Why Rotate?



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#### Soil Management: Why Rotate?

- Using a crop sequence that has more of a "integrated rotations" approach.
- We may still focus on a main crop (potato)
- We may design our other crops for different purposes:
  - Organic matter? looking for biomass to plough down
  - Soil health? biodiversity
  - ➢ Water conservation? —quick cover, high water use efficiency
  - > Nutrient scavenging? rooting depth where you expect nutrients to be
  - Cash flow? cash crop to bring in \$
  - Disease management?—non-susceptible species or suppressive species
  - Weed management? —smothers or outcompetes annual weeds, or is compatible with herbicides needed to manage a problem