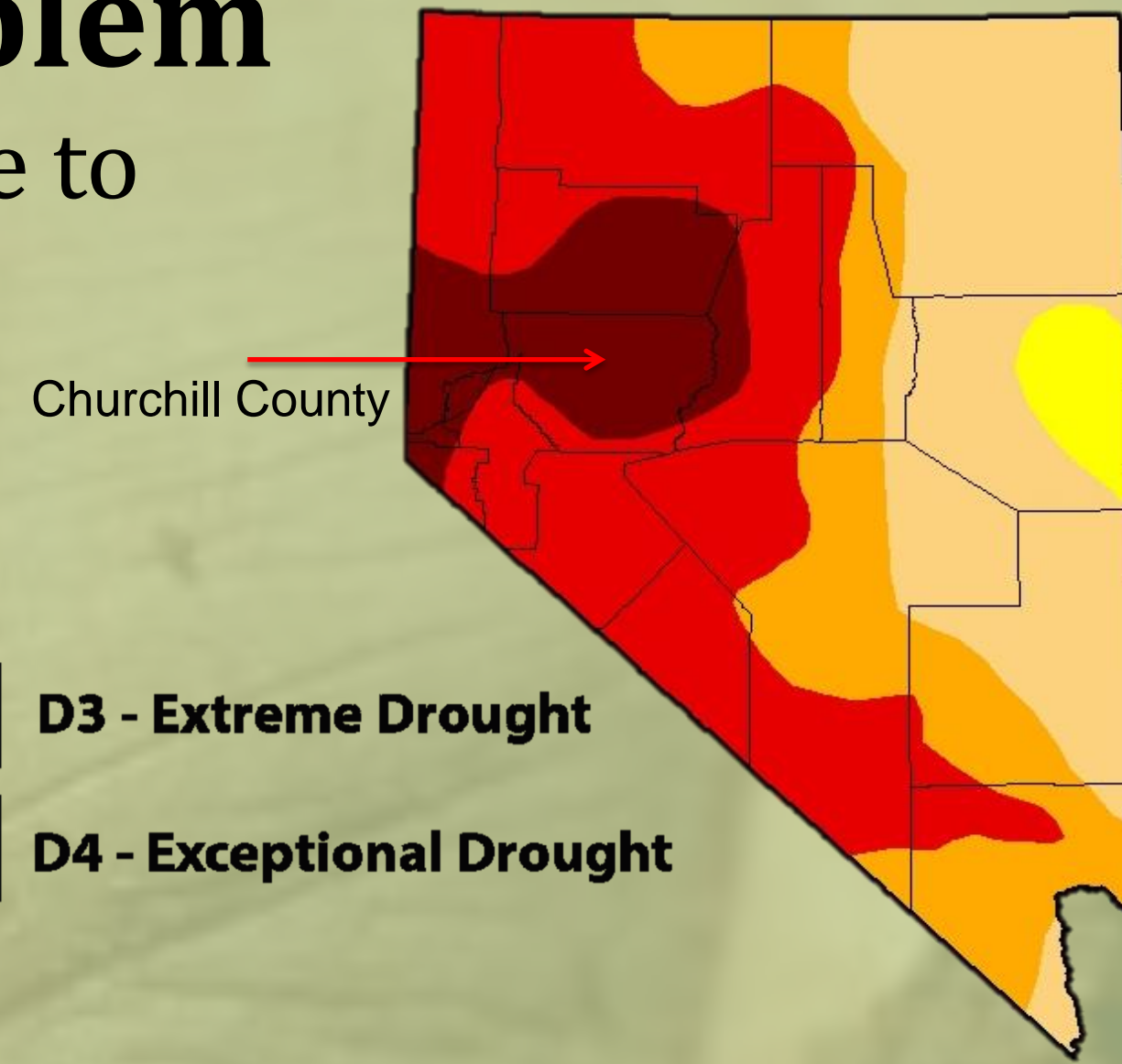


SOIL TURMOIL

Sydney Brooks (CE), Alexandra Emrick (RBE), Jeremiah Leonard (ME), Joseph Salice (ECE)
 Advisors: Professor Kristin Wobbe (UGS) and Professor Sharon Wulf (BUS)

Problem

Droughts are increasing due to climate change in western Nevada, lowering crop yields.



- D0 - Abnormally Dry
- D1 - Moderate Drought
- D2 - Severe Drought
- D3 - Extreme Drought
- D4 - Exceptional Drought

U.S. Drought Monitor. Retrieved December 8, 2014.

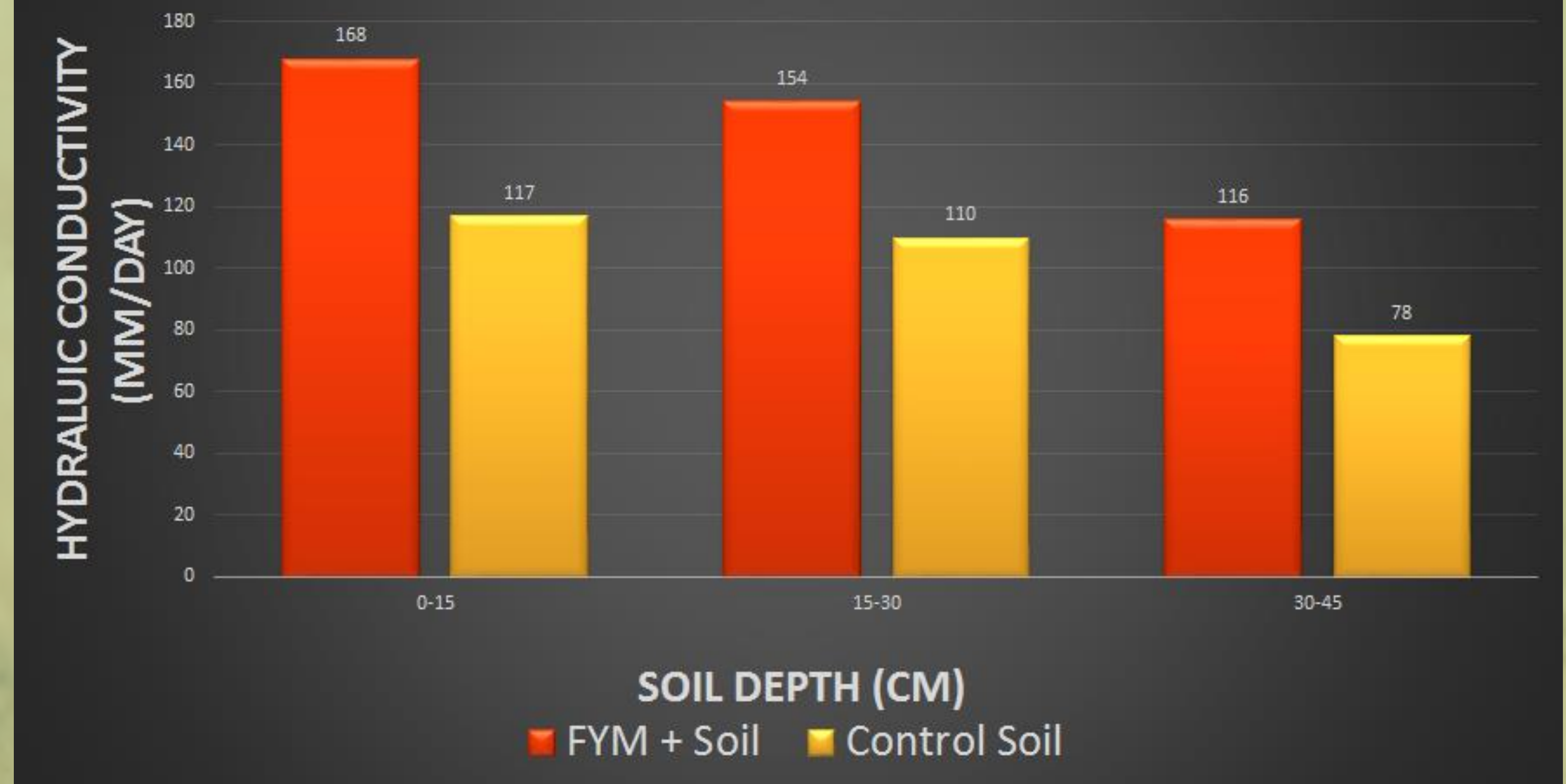
What is Direct Injection?

Direct injection is a method to incorporate manure into crop soil by feeding it into the soil instead of spreading it on top of the soil.



Flexibility of No Till and Reduced Till Systems Ensures Success in the Long Term. Retrieved December 8, 2014.

Hydraulic Conductivity of Soil

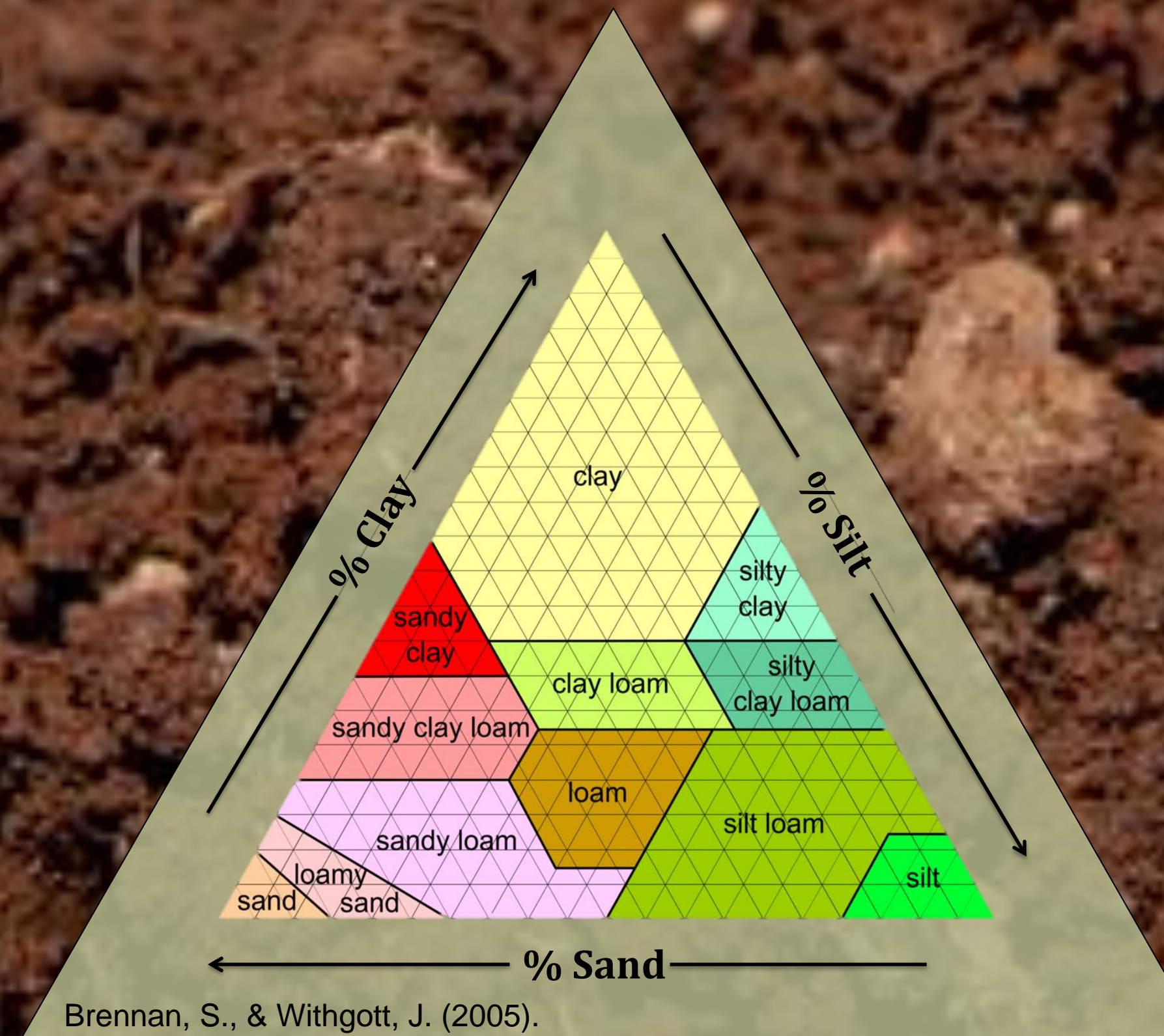
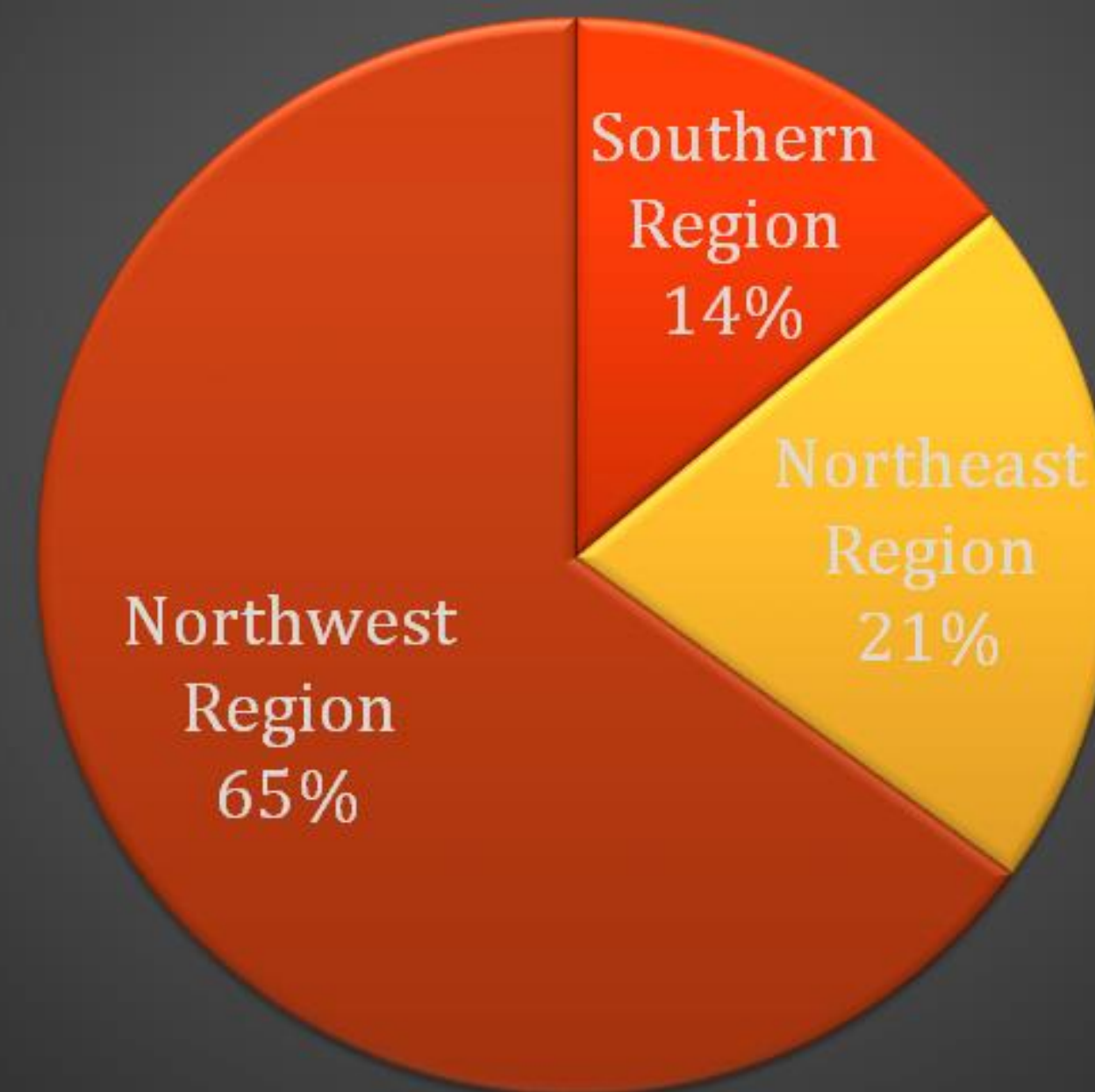


This graph shows that the addition of farmyard manure (FYM) to silt clay loam increases hydraulic conductivity.

Background

- Nevada soil types: clay loam and silt clay loam
- Poor water flow
- Clay content is too high
- Heavy irrigation is necessary

Agriculture Production in Nevada By Region



Assessment

- Measure Clay Percentage
- Test Water Flow
- Measure Crop Yields



Plant Root Systems. (n.d.). Retrieved December 10, 2014.



Minidisk Infiltrometer

ADVANTAGES



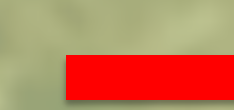
Optimize soil composition

Eliminates waste from farms

Allows water to flow easier within soil

Increases crop yields

DISADVANTAGES



Difficult to gather waste on farms

Direct injection machine costs \$9,000-\$60,000

Process needs to be repeated for results

Transporting manure has a high cost

Solution

- Collect manure from CAFOS in California
 - 76 metric tons/hectare
 - Manure Transport and Matching Service
- Use direct injection to incorporate manure into clay loam and silt clay loam soil

Acknowledgments

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