Soil compaction can be associated with a majority of field operations which are often performed when soils are wet and more susceptible. Heavy equipment and tillage implements can cause damage to the soil structure, which reduces the soil’s ability to hold and conduct water, nutrients and air necessary for plant root activity. Despite research, it is still difficult to estimate the exact economic impact because fields vary in soil types, crop rotations and weather conditions.

**WHAT IS SOIL COMPACTION**

Soil compaction occurs when soil particles are pressed together, reducing pore space between them. Heavily compacted soils contain few large pores and have a reduced rate of both water infiltration and drainage. The large pore spaces are the most effective at moving water when the soil is saturated. In addition, the exchange of gases slows down in compacted soils, causing an increases in the likelihood of aeration related problems. Finally, a compacted soil also means that roots must exert greater force to penetrate the compacted layer.

**MANAGING TO REDUCE SOIL COMPACTION**

Managing soil compaction involves decisions that affect activities both above and below the soil surface.

Reducing traffic when fields are wet in the spring, reducing tillage, making sure tires are inflated properly and controlling traffic patterns are all soil surface activities which can affect soil compaction.

Building a strong soil structure through planting crops with diverse root systems is also key for reducing soil compaction. Adding cover crops with deep rooting plants help to build downward channels in the soil and break up compacted layers. Sunflowers and turnips are two examples of deep rooting cover crops.

It’s important to think long-term when managing to reduce soil compaction. It takes many years to build soil structure, but results in improved crop productivity and soil health.

**MEASURING SOIL COMPACTION**

Compaction is likely to some degree due to field traffic. The level of compaction will vary by farm, soil type and across a single field. The best time to measure compaction is in early spring, or when soil has a good moisture content. Perform several test in an area to get an accurate measurement and check a fence row and the field (comparing the same soil types) to get a “before-and-after” comparison.

**Materials needed to determine the depth of compaction**

- 18” metal pointed metal rod (or wire marking flag)
- tape measure
- or soil penetrometer (contact your local NRCS office to use this alternative tool to measure compaction)

**STEP ONE**

Determine resistance: Use the metal road to probe down into the soil. Determine changes or difference in penetration resistance as you push the probe through the soil. A compaction layer is typically found at the depth of your tillage.

**STEP TWO**

Use the tape measure to measure the depth at which resistance was observed.

**STEP THREE**

Record the depth of resistance.

**RECORD RESULTS**

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<tr>
<th></th>
<th>Site 1</th>
<th>Site 2</th>
<th>Site 3</th>
<th>Avg</th>
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<tbody>
<tr>
<td>Compaction Depth at Fence Row</td>
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<tr>
<td>Compaction Depth in the Field</td>
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