



## Rebounding from Reduced Nutrient Levels

As a result of the wet spring conditions the last 2 years, many growers are concerned about the lower nutrient numbers on their soil tests.

A Nebraska grower is seeing water soluble calcium and potassium numbers that are half of what they were 2 years ago. Does this mean he is doing something wrong, or “mining the soil”? **Not necessarily.**

There is much documentation about what the effects of very wet seasons have on soil nutrient levels, especially the soluble portion, and we can offer practical suggestions on how to overcome this issue and grow a great crop in 2020.



The Midwest Labs Agronomy Handbook classifies soil water into three types:



### 1. Hygroscopic Water

Water adsorbed from an atmosphere of water vapor as a result of attractive forces in the surface of the soil particles; it is generally unavailable to plants.

### 2. Capillary Water

This water is held in the capillary spaces and as a continuous film around the soil particles. This water forms the soil solution, which contains the soluble products of the soil and is the main nutrient medium for plant roots.

### 3. Gravitational Water

This water is not held by the soil, but drains under the influence of gravity, and can remove cations and other soluble nutrients that are not adsorbed by the colloidal mass of the soil, what we call leaching. This is what happens when the soil exceeds field capacity, the maximum water that a soil can hold on to.

With the record rainfall and heavy rain events the past 2 years, this type of leaching has happened over and over again, often never giving the soil a chance to recover in between these deluges. Combined with the effect of compaction and working our soils in less than ideal conditions, many of our soils really have taken a beating!

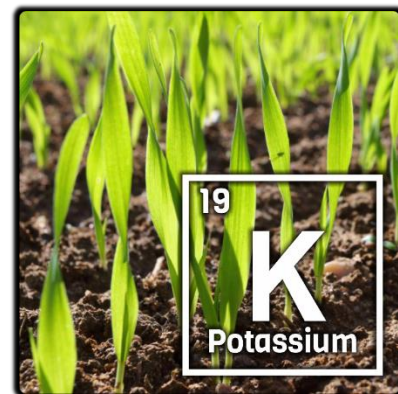
All of these factors have reduced the amount of soluble nutrients, both cations and anions, that are held by the soil. Of course, the primary nutrients of nitrogen, phosphorus, and potassium are our first line of concern. Let's look closer at potassium.

### Soil potassium (K) classified into three categories:

**1. Relatively Unavailable Potassium** This form is locked in insoluble primary minerals that release far too little to help growing crops. It constitutes approximately 90-98% of the total K in soil.

**2. Slowly Available Potassium** This form is dissolved from primary minerals or potassium fertilizer and attached to the surface of organic matter and clay minerals and between layers of clay minerals where it is only released by weathering. It constitutes 1-10% of the total K in soil.

**3. Readily Available Potassium** This form is held by organic matter and on the edges of the clay mineral layers. It is also present already dissolved in the soil solution from where it may be taken up by plant roots. It constitutes 0.1-2% of the total K in soil. Potassium does not leach readily in medium and fine textured soils; however, on sands and organic soils leaching losses can be serious.



Nearly every secondary and micronutrient can also be leached out. For example, sulfur must be in the sulfate form to be plant available. However, in the sulfate form it is highly soluble and most susceptible to leaching. This certainly explains why so many soil tests now read in the single digits for sulfur.

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#### Here's 6 things you can do to reduce the challenge of wet conditions and lower nutrient levels:

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1. **Use a starter fertilizer.** Placement of key nutrients near the seedling can overcome soil deficiencies caused by cold, wet soils.
2. **Increase microbial activity** in the soil with MST, SP-1, MT-17 and Residue. Microbes are key to making more nutrients plant available.
3. **Use complex blends** to cover all of the nutrients. Don't just feed your plants with NPK, give them the whole nutrient buffet!
4. **Consider in season soil and tissue testing.** Pre-side dress nitrogen tests (PSNT), along with plant tissue or petiole tests can help you fine-tune the plant's in-season needs.
5. **Split apply nutrients – sidedress.** Splitting up applications of primary nutrients like nitrogen can spread your budget much farther and make the most of each pound applied.
6. **Foliar feed.** Whether it's foliar spraying to address a deficiency, or a diverse mix to push a good crop even better, foliar spraying is a highly efficient way to deliver nutrients and biology to the plant.



815.872.1190

Give us a call today for assistance in improving your nutrient levels this spring.