

## Differentiating Soil Salinity versus Soil Sodicity

### The Situation

Commonly described as saline-spots, alkali-ground, sour-ground or salt-land, soil salinity and sodicity problems are on the rise throughout North Dakota. As per a study there are about 5.8 million acres affected by soil salinity in North Dakota (Brennan, J., and M. Ulmer. 2010. Salinity in the northern Great Plains. Natural Resources Conservation Service. Bismarck, N.D.).

Saline soils have excessive water soluble salts (e.g. magnesium sulfate and sodium chloride), which reduce plant ability to absorb soil water and nutrients even under wet conditions. The end result is drought-stressed plants and ultimately reduced productivity. Sodic soils have excessive sodium attached to their cation exchange sites that is difficult to leach without getting displaced by other cations like calcium. Excessive sodium damages soil structure by dispersing soil aggregates. That leads to problems like poor soil drainage, soils which are difficult to till, poor seed germination, poor root growth and potential for wind and water erosion.

Given the continuous increase in the problematic areas and the limitations faced by the landowners, management of these issues is a top priority. The key is to first understand the differences between these two soil issues.

### Extension Response

In order to differentiate soil salinity from soil sodicity, different outreach methods were adopted to reach out to the stake holders. First a series of presentations were delivered in close coordination with NDSU county extension agents during the new agent training, county meetings, annual field day, crop tours, field tours, fall conference, field day and soil health workshop. The same concept was also emphasized during the chamber of commerce and crop improvement board meetings along with meetings with the other partner agencies like NRCS, SCD and FSA. Six farmers were helped for soil sampling and getting their soils analyzed for salinity and

sodicity. To keep the momentum going and to reach out to the remaining segments of the population, a weekly radio program under the umbrella of "Talking Ag." was also launched in July-2012 in coordination with the other Area Specialist, Lesley Lubenow. With the help of Langdon based Simmons Broadcasting, two videos were also made on "Soil Salinity and Sodidity", and "Groundwater and Its Effect on Crop Production". To supplement this, two pocket sized pamphlets and one letter sized brochure were compiled on the same topics to hand these over to the farmers/landowners to take back home and read in detail. For easy online access, all of the literature and videos were made available at the Langdon REC soil health webpage:

<http://www.ag.ndsu.edu/langdonrec/soil-health>

### Impacts

Around 729 people were contacted through face to face interactions whereas 513 views were recorded for the YouTube videos. For the weekly radio programs an estimated number of 400 people were reached. In all 1642 individuals were contacted through different mediums.

### Feedback

"One of the best meetings I have ever attended. Worked with Naeem Kalwar earlier this year regarding soil sampling. Will be working with Mr. Kalwar in the future with saline and sodic areas on our farm"! Charles Novak at the end of Soil Health Workshop, December 6, 2012.

### Contact

Naeem Kalwar  
Extension Area Specialist/Soil Health  
9280, 107<sup>th</sup> Avenue NE, Langdon, ND 58249  
(701) 370-0209, ext. 113  
Naeem.kalwar@ndsu.edu