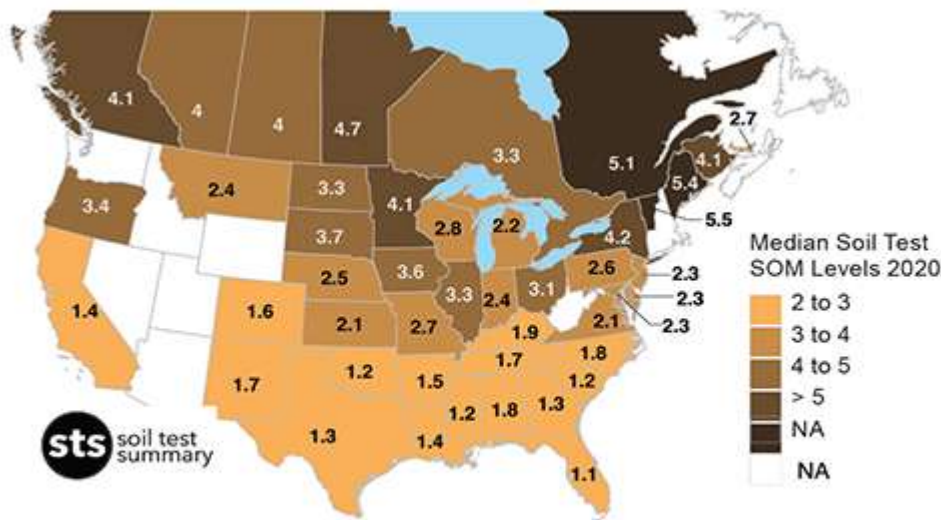


Soil Organic Matter and Drought

By John McGregor, MFGA Extension Support

Over the past 30 to 40 years, Manitoba farmers have shifted towards continuous cropping, direct seeding and reduced tillage. These practices have been very positive in starting the process of increasing soil organic matter (SOM) levels, which, in turn, is improving soil quality.

Direct seeding and/or reduced tillage maintains a protective cover of residue from previous crops on the soil surface. This helps reduce water and wind erosion and conserves soil moisture for future crops. Most importantly plant residues are added to the soil every year, slowing the rate of decay of organic materials. By cropping the land each year, organic residues are continually produced to maintain and hopefully increase SOM levels compared to previous farming practices. Returning more residues to the soil can increase organic matter content and eventually a new SOM equilibrium level.



This map shows Manitoba having an average SOM of 4.7 but typically, soils in agro-Manitoba range from two to seven per cent organic matter.

Organic matter (OM) plays a significant role in crop production and soil health. Soils with higher OM can infiltrate and store water at greater capacities which can help reduce environmental stresses like drought or excess moisture. USDA research

indicates a one per cent increase in soil organic matter can increase soil water holding capacity by around 25,000 gallons per acre. That's equivalent to one inch of rain.

Manitoba experiences drought and/or excess moisture conditions often. Multi-year droughts occurred in Manitoba in the 1810s, 1890s, 1930s, and 1980s. The 1988 drought was considered the last bad general drought across Manitoba until 2021. Both caused crop failures, yield losses, feed shortages and other financial hardship. Manitoba also experienced drought conditions from 2018-2020.

1993 to 2005 was the wettest period going back more than a century. In 2010, 2011 and 2014, we saw between 1.6 and 3.4 million acres per year lost to flooding.

Besides these major events across Manitoba, crops can also be stressed during shorter periods of excess moisture or dryness due to heavy downpours or extended periods of dry and heat.

So where does SOM fit into this picture?

Based on a study by the Agriculture Financial Services Corporation (AFSC), Alberta farmers may one day see lower crop insurance premiums if they have high levels of soil organic matter (SOM) in their soil. The study found that farms with higher soil organic matter have better yields and lower crop insurance claims.

AFSC researchers divided fields according to the level of soil organic matter. The fields with above average levels produced an average 71.5 bushels of barley per acre last year, while the below average ones yielded just 59.5 bushels. It was a similar story with canola.

Over the past 21 years (2000-2021) 50 per cent of insurance payouts were made due to drought conditions or water limitations.

Although AFSC isn't planning on implementing premiums based on SOM at present, the research does foster discussion on the importance of SOM.

If we look at Manitoba Agriculture Services Corporation (MASC) data between 1966 and 2018, 38 per cent of crop insurance payouts were due to excess moisture compared to 33 per cent for drought and heat. If soils with higher SOM levels were better able to weather drought conditions therefore producing higher yields or if soils with higher SOM were able to handle excess moisture better, resulting in reductions in delayed seeding due to flooding or drowned out fields, losses of this magnitude could be reduced significantly.

The outcome of building and maintaining a healthy soil with greater OM can provide a stronger foundation for higher crop yields, greater resiliency to environmental stress and greater long-term profitability.