



## **Climate Change, Soils, and Human Health**

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According to the Intergovernmental Panel on Climate Change, global temperatures are expected to increase 1.1 to 6.4 degrees C during the 21st century and precipitation patterns will be altered by climate change (IPCC, 2007). Soils are intricately linked to the atmospheric/climate system through the carbon, nitrogen, and hydrologic cycles. Altered climate will, therefore, have an effect on soil processes and properties. Studies into the effects of climate change on soil processes and properties are still incomplete, but have revealed that climate change will impact soil organic matter dynamics including soil organisms and the multiple soil properties that are tied to organic matter, soil water, and soil erosion. The exact direction and magnitude of those impacts will be dependent on the amount of change in atmospheric gases, temperature, and precipitation amounts and patterns. Recent studies give reason to believe at least some soils may become net sources of atmospheric carbon as temperatures rise; this is particularly true of high latitude regions with permanently frozen soils. Soil erosion by both wind and water is also likely to increase. These soil changes will lead to both direct and indirect impacts on human health. Possible indirect impacts include temperature extremes, food safety and air quality issues, increased and/or expanded disease incidences, and occupational health issues. Potential direct impacts include decreased food security and increased atmospheric dust levels. However, there are still many things we need to know more about. How climate change will affect the nitrogen cycle and, in turn, how the nitrogen cycle will affect carbon sequestration in soils is a major research need, as is a better understanding of soil water-CO<sub>2</sub> level-temperature relationships. Knowledge of the response of plants to elevated atmospheric CO<sub>2</sub> given limitations in nutrients like nitrogen and phosphorus and how that affects soil organic matter dynamics is a critical need. There is also a great need for a better understanding of how soil organisms will respond to climate change because those organisms are incredibly important in a number of soil processes, including the carbon and nitrogen cycles. All of these questions are important in trying to understand human health impacts. More information on climate change, soils, and human health issues can be found in Brevik (2012).

### References

Brevik, E.C. 2012. Climate change, soils, and human health. In: E.C. Brevik and L. Burgess (Eds). Soils and human health. CRC Press, Boca Raton, FL. in press.

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