

Contaminants

Research on contaminant transport and control in soils can improve soil, water, ecosystems, human health and reduce risk to food safety.

Several classes of contaminants reach the soil through several means. Excess nitrogen and phosphorus leaving the soil and entering water bodies can cause degradation of water supplies and ecosystems. Both organic and inorganic fertilizers—when improperly managed—can contribute to nitrate and phosphorus contamination through transport of excess quantities over the soil to surface waters, and through the soil to ground and surface waters.

Research has shown that rates and timing of applications to coincide with plant demand can reduce the risk of nitrate contamination of water, as can efficient methods of application and soil conservation practices to reduce erosion and runoff. Understanding the processes that cause retention and transport of excess nutrients, and development of models to predict nutrient movement, can improve guidelines and recommendations for managing these soil amendments, according to the particular soil, crop, and season.

Contaminant spills, as well as pesticide applications and disposal of wastes containing organic contaminants, can lead to transport of these contaminants into water bodies. Transport properties of this kind of contaminant can be very different from transport properties of nutrients. These kinds of contaminants behave differently from nutrients. Models for predicting transport are needed, based on understanding of mechanisms of retention and transformation of these molecules in the soil.

In some cases, contaminants can be transported through and over soil via colloids or suspended particles that contain the contaminants. NIFA supports research, education, and extension activities toward a better understanding of mechanisms, appropriate use of models, and increased awareness of the practices that lead to mitigation of contaminant transport and environmental degradation.