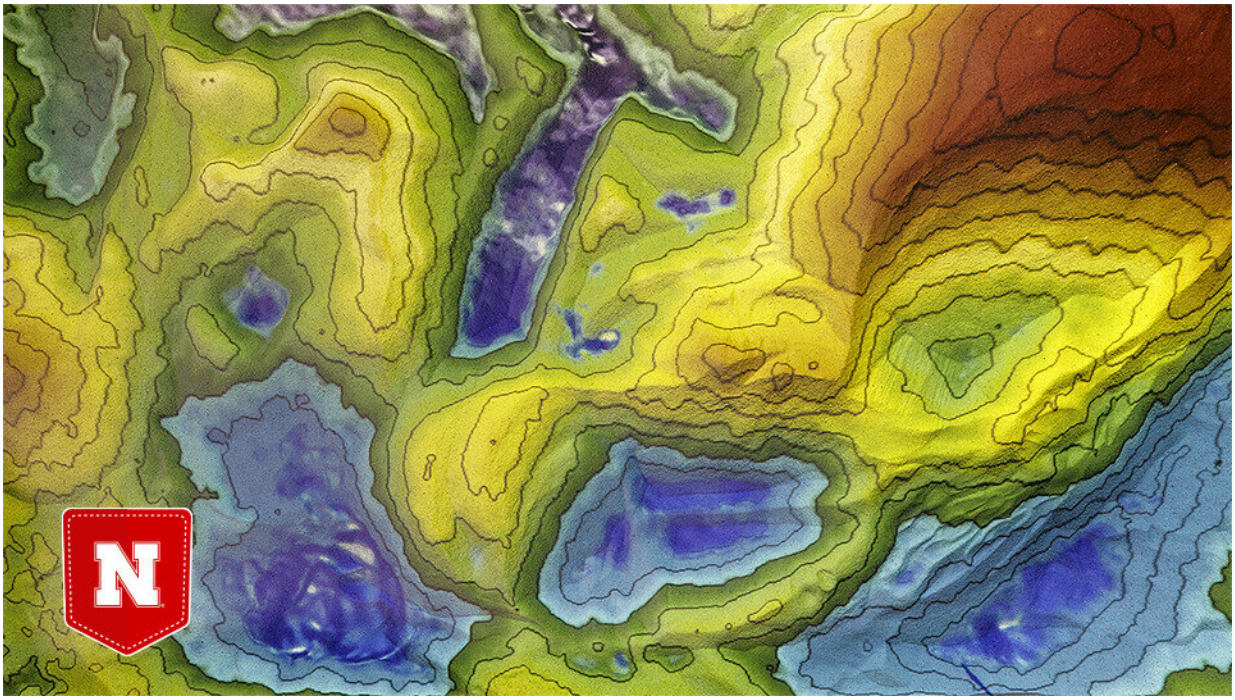
Buffer could limit environmental spread of antibiotic resistance

September 7 2020, by Scott Schrage



A top-down view of an augmented-reality sandbox that allows users to sculpt contour maps and observe the dynamics of water flow in real time.

Many livestock receive antibiotics that protect against bacterial diseases. But over time, antibiotics also trigger the evolution of bacteria that can resist them. Those antibiotic-resistant bacteria, in turn, can pass along genes responsible for that resistance to other bacterial species, ultimately reducing the effectiveness of the drugs.

When manure from livestock administered with antibiotics is applied as fertilizer, antibiotic resistance genes can enter soil and, following precipitation, run off into rivers and other bodies of water, furthering their spread.

A research team led by Nebraska's Xu Li ran experiments to evaluate the minimum distance between a manure slurry-covered field and surface water that would prevent the runoff of antibiotics and antibiotic resistance genes. The team found that levels of all three antibiotics it measured, along with seven of the 10 resistance genes, substantially decreased as that distance increased.

The researchers concluded that maintaining between 112 and 220 feet of distance would limit most runoff pollution across a no-till field rich in the clay soils common to southeastern Nebraska.

Because that recommended distance is specific to the experimental site, the team recommended running similar experiments with varying field conditions, soil types, slopes and rainfall amounts to calibrate suitable distances elsewhere.

More information: Maria C. Hall et al. Influence of Setback Distance on Antibiotics and Antibiotic Resistance Genes in Runoff and Soil Following the Land Application of Swine Manure Slurry, *Environmental Science & Technology* (2020). DOI: 10.1021/acs.est.9b04834

Provided by University of Nebraska-Lincoln

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