

With feedlot manure, it pays to be precise

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The same precision farming techniques that work with crops can work with manure management on cattle feedlots, according to U.S. Department of Agriculture (USDA) scientists.

Agricultural engineers Roger Eigenberg and Bryan Woodbury and their colleagues with USDA's Agricultural Research Service (ARS) in Clay Center, Neb., map the distribution of [manure](#) on the surface of feedlots and the flow of liquid manure in rain runoff.

This research could lead to both precision harvesting of manure and also precision application of manure to crop fields, while controlling nutrient losses, gas emissions, and odors.

The scientists, at the ARS Roman L. Hruska U.S. Meat Animal Research Center in Clay Center, map manure distribution by slowly towing a GPS-equipped conductivity meter over feedlot pens and cropland. The meter estimates the amount and quality of manure in various places on the feedlot surface by measuring the manure's ability to conduct electricity.

Manure contains salt from feed supplements. Salt, in solution, is an excellent conductor of electricity.

The researchers used an ARS-developed computer program, called ESAP ([Electrical Conductivity](#) Spatial Analysis Program), to choose spots on the feedlots and a nearby hayfield to sample soils, rather than sample randomly. Eigenberg and his colleagues used the program to associate high soil conductivity levels with manure solids and with the

chloride in the salts found in manure.

These techniques could be used to help feedlot operators recover valuable byproducts from the feedlot surface, such as manure suitable for burning to generate steam. It could also allow selective harvesting for a fertilizer with a higher nitrogen and phosphorus content, by scraping from the "sweet spot" of the pen.

Eigenberg and Woodbury also mapped a hayfield, downslope of the Clay Center feedlot, designed to capture and use manure nutrients.

The scientists found that the liquid manure in rain runoff was being unequally distributed to the hayfield. So, they made adjustments to flow tubes, resulting in a more uniform runoff and a more effective treatment area.

More information: Read more about this research in the May/June 2011 issue of Agricultural Research magazine.

www.ars.usda.gov/is/AR/2011/may11/feedlot0511.htm

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