Reducing Greenhouse Gas Emissions from Stored Manure

As livestock production intensifies—that is, more animals are kept on fewer farms—larger amounts of manure are stored for many months to prevent nutrient contamination of ground and surface waters, and so that manure can be applied during the growing season. However, manure storage units have little oxygen, promoting production of the greenhouse gas (GHG) methane. Methane is estimated to be 86 times more powerful than CO₂ (over 20 years) in contributing to climate change.

In the January–February 2016 issue of the Journal of Environmental Quality, researchers report how changes in manure management on New York dairy farms since 1992 have affected GHG emissions. The authors also estimated the costs of reducing future GHG emissions. They found that despite multiple efficiency improvements, the shift from daily spreading of manure to storing liquid manure has doubled dairy farm GHG emissions since 1992.

Fortunately, methane is easily combusted to CO₂, greatly reducing its effect on climate, and some farms have covered their manure storage units to capture and flare the methane gas. The authors found that covering and flaring methane from most storage units would reduce GHG emissions from manure by 62% at a cost of $13 Mg CO₂e−1, which is within the range currently paid in carbon markets.


Soil–Water Interactions Control Phosphorus Loss in Cranberry Floodwaters

Commercial production of cranberries is increasingly seen as a potential source of phosphorus in lakes receiving floodwater discharge. Given growing pressures to mitigate phosphorus (P) losses in key cranberry regions, there is strong interest in understanding processes that control phosphorus loss from cranberry farms.

In a study in the January–February 2016 Journal of Environmental Quality, researchers with the USDA-ARS and University of Massachusetts showed that increases in floodwater P were consistent with the transport of dissolved P in soil water, as well as the mobilization of particulate P in ditches. Although patterns were generally pervasive across the study sites, magnitudes of P loss varied widely, ranging from less than 0.8 to as high as 4.7 kg P ha⁻¹.

As P loss was greatest for older cranberry bogs during the harvest flood, a first goal in remedial management should be to curtail P losses in non-renovated bogs during the cranberry harvest. This could possibly be achieved by capitalizing on the sorption capacity of Fe-rich bog soils or focusing on moments of disproportionately high P export. Other promising activities include amending floodwater with Ca-based materials that remove P from solution and produce a relatively insoluble Ca-P mineral.