

by Dean Letter
Director, Member Services



Keeping Nutrients Where They Are Needed

As stewards of the land on which they live, farmers have a plan for utilizing the nutrients in the manure produced on their farms. It is part of the natural recycling process that has been taking place for hundreds of years. As the cost of commercial fertilizers increases, animal manure's value to grow crops and improve soil health continues to become apparent.

Managing this nutrient resource can be especially difficult this time of year. One of the challenges with manure application on frozen or snow-covered fields is keeping the nutrients where they are needed. For this reason, spreading manure under these conditions is only allowed if specific practices on appropriate fields are followed, but it is discouraged.

The Right-to-Farm Manure Generally Accepted Agricultural and Management Practices (GAAMPs) are Michigan's guidelines for manure application. In regards to application on frozen or snow-covered ground, the GAAMPs state:

"Application of manure to frozen or snow-covered soils should be avoided, but where necessary, (a) solid manures should only be

applied to areas where slopes are 6 percent or less and (b) liquid manures should only be applied to soils where slopes are 3 percent or less. In either situation, provisions must be made to control runoff and erosion with soil and water conservation practices, such as vegetative buffer strips between surface waters and soils where manure is applied."

While "winter" spreading should be avoided, provisions are made for farms without sufficient manure storage to make it to spring. The Michigan Agriculture Environmental Assurance Program (MAEAP) recommends evaluating fields for manure application suitability using the Manure Application Risk Index (MARI). There are several key field characteristics and manure application practices MARI considers when determining a field's suitability for winter spreading.

Soil Hydrologic Group: These soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet and receive precipitation from long-duration storms.

Group A soils typically have a higher infiltration rate or low runoff potential. With each successive soil group, the amount of coarse texture aggregates decrease as fine texture aggregates increase. As the level of fine texture aggregates increases, the runoff potential also

increases. Therefore, Group D soils, consisting of clays, high water table (regardless of aggregate size) or a claypan near the soil surface, have the highest runoff potential.

Group A soils are most favorable for "winter" spreading while Group D soils present the highest risk for manure runoff. Some fields may fall into dual hydrologic groups because of the varying condition across the field. A field's soil hydrologic group may be found in each county's USDA-NRCS soil survey or online on the NRCS Web Soil Survey at: <http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm>

Soil Management Group: These groups refer to soil structure, slope, drainage and other characteristics that lend to different management requirements. Soil management groups that allow for greater water-holding capacity with lower risk of erosion and runoff potential are better candidates for "winter" spread.

Percent Slope: Naturally, nutrients applied to land with less slope are more likely to remain in place than nutrients applied to land having greater slope. Very low risk fields have slopes less than 2 percent while high risk fields have slopes that exceed 6 percent. This field characteristic is a limiting factor to "winter" application according to Right-to-Farm GAAMPs. The percent slope can be measured in the field or referenced from the county's soil survey or USDA's Web Soil Survey.

Continued on page 11

Continued from page 6

Soil Test Phosphorus (P) Value:

Fields with less than 80 lbs of phosphorus per acre are very low risk for “winter” spreading. Risk increases with the level of phosphorus in the field. Fields exceeding 300 lbs/acre are not eligible for manure application. Soil phosphorus level is often a limiting factor for manure application and is noted as a limiting factor in the Right-to-Farm GAAMPs. Phosphorous levels should be determined using current (less than four years old) soils tests.

Concentrate Water Flow or Surface Inlet Discharge:

This is a reflection of the possibility of routes of water flow leaving the field to surface water such as streams or county ditches. This field characteristic is also referenced in Right-to-Farm GAAMPs. Concentrated water flows and surface inlet discharge are determined by walking your fields and recognizing runoff water flow patterns.

Nitrogen Leaching Index: This classifies soils as having a high, medium or low leaching potential of nitrates below the root zone. The leaching potential is determined by combining the soil’s hydrologic soil grouping (A, B, C or D) and the area’s seasonal and annual rainfall. High fall and winter precipitation combined with high soil water infiltration capacity reduce suitability for winter manure application. The nitrogen leaching index is also found in the MARI resource table.

Residue or Cover Crops: “Winter” manure application is most suited to fields with greater than 40 percent crop residue or a good cover crop. Suitability decreases with reduced crop residue or poorer stand of cover crop as it decreases the field’s ability to hold the manure in place.

Surface Water Setback: A field’s application risk is reduced with greater distance from surface water sources. Low risk fields are at least 150 feet from surface water. Incorporating manure can also reduce the risk.

Vegetative Buffer Width:

Vegetative buffer strips provide a form of treatment when nutrients or sediment starts to move off the field. By capturing nutrients and sediment or slowing its movement, buffer strips help maintain the water quality of surface waters. Ideally, in cases where buffer strips may apply, they should be at least 100 feet wide. Risk goes up significantly as the width is reduced. High risk fields have less than 20 feet of vegetative buffer.

Manure Application Rate (P₂O₅ lbs/acre): As one might imagine, a lower application rate lessens the risk of phosphorus runoff. Applying less than 61 lbs/acre is considered a low risk rate. Applying over 99 lbs/acre is a high risk practice.

Manure Application Rate (N lbs/acre): This is similar to phosphorus; applying 130 lbs/acre or less is considered a low risk rate. Applying over 200 lbs/acre is a high risk practice.

Manure Application Method:

Injecting or incorporating manure into frozen or snow-covered ground reduces the chance of nutrients leaving the field in the event of rapid winter or spring thaw. Surface applying without incorporation within 48 hours increases environmental risk.

Through a MARI evaluation, a field will receive a numeric score between 12 and 96. A lower numeric score indicates a field and practice with lower environmental risk. Scores of less than 38 are considered low risk options for “winter” manure application.

Members wanting more information on reducing their environmental risk may contact their MAEAP technician by calling their local NRCS or County Conservation District office, MMPA member representative or the Novi office.

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