

# AGRICULTURAL ENGINEERING INFORMATION SERIES

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## CAPTURING LAND-APPLIED MANURE IN THE ROOT ZONE<sup>1</sup> PART 1: SEDIMENT AND CONTAMINANT RUNOFF

Management practices that capture land-applied manure in the root zone will make the nutrients available for the next crop, improve soil quality, and prevent manure nutrient and contaminant loss in runoff. The idea of capturing manure in the root zone is quite simple, but in practice it can be quite challenging as weather, soil and site-specific field conditions change.

Each season presents a new set of challenges in manure handling. Summer spreading may cause less soil compaction, but fly and odor related problems will increase. Spreading in the winter may reduce these problems but give rise to other problems related to runoff of nutrients and contaminants. Spreading on tile drained land may require special efforts to prevent manure loss through tile lines. **The challenge for a livestock producer is to apply the manure in a way that is labor efficient, cost effective, and environmentally responsible.**

The single most important tool in preventing manure nutrient and contaminant loss to the environment is *your knowledge of your fields*. You know which of your fields are erosive and prone to rapid runoff during spring snow melt. Manure will be lost in runoff water, so soil conservation practices such as managed crop residue, grassed waterways and buffer strips that stabilize soil will also hold land-applied manure in place. **The best manure management plans are custom designed on a field-by-field basis.** These plans will be established within the context of established best management practices and fine-tuned for each field by using a process of *application*, careful *observation*, and *evaluation* of the results. *Apply* manure, *observe* what happens, and *evaluate* the effectiveness in capturing manure in the root zone where it will be a benefit to your cropping system rather than be a hazard to society.

### **EVALUATE THE RISK OF RUNOFF:**

The first step in creating a field-by-field land application plan is to evaluate each of your fields and rank them based on the potential for nutrient loss and runoff. In most cases several conservation practices will be needed. For instance, a system of residue management in combination with buffer strips and grassed waterways will be more effective than residue management alone.

- Fields nearby surface waters increase the risk of water pollution. If the field slopes toward a ditch that leads to surface water, either select another field for spreading or adopt a system of conservation practices that stabilize the soil.
- Assess the fields before spreading and identify erosive areas. This is the route that sediment and manure nutrients will follow if there is rain or snow melt.

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### GAAMP'S HELPFUL IN PREVENTING NUTRIENT AND CONTAMINANT RUNOFF:

This is a brief summary of some of the GAAMP's that will be helpful in reducing runoff of sediment and land-applied manure. You can download a printed copy of the GAAMP's with a more detailed explanation from the website at: <http://www.michigan.gov/mda> Click *Farming* and then click *GAAMP's*.

- Application rates should be based on the ability of the soil to accept and store water and the ability of plants to utilize nutrients.
- Runoff from pasture feeding and watering areas should travel through a vegetated filter area to protect surface and groundwater.
- Manure should be uniformly applied and the amount applied should be known.
- Manure should not be applied to soils within 150 feet of surface waters or to areas subject to flooding....
- Liquid manures should be applied in a manner that will not result in ponding or runoff to adjacent property, drainage ditches, or surface water.
- As land slope increases, the risk of runoff and erosion also increases. Soil and water conservation practices should be used which will control runoff and erosion for a particular site.
- Records should be kept of manure analysis, soil test reports, and rates of manure application for individual fields.

### ACTIONS TO REDUCE THE RISK OF MANURE RUNOFF:

- Evaluate your farm on a field-by-field basis and rank them based on the potential for manure loss. Ask yourself: "if it rains tomorrow, will runoff leave the field?" Then ask yourself what could be done to minimize this risk.
- Excessive application rates increase the chance of runoff and nutrient loss. Calibrate manure spreaders, and verify that the calibrated rate is the rate that is actually applied to the field. *Based on observation and evaluation, determine the right application rate for your fields. On some fields, the right rate may be considerably less than the allowable agronomic rate based on manure nutrient content.*
- Inject, use rapid incorporation whenever possible, or loosen the soil with tillage before spreading to create a rough, permeable surface.
- Use soil and water conservation practices such as crop residue management, grassed waterways, buffer strips, strip crops, or planting on the contour.
- Use spreading setbacks to separate manure from streams, and from ditches that flow to streams.
- Establish a cover crop that will be growing during manure applications. Cover crops reduce sediment and nutrient runoff and improve infiltration.
- Decrease the manure application rate, and avoid spreading in the rain or when rain is in the forecast.
- Read, understand and adopt the *Generally Accepted Agricultural and Management Practices for Manure Management and Utilization*. These will form the foundation of your site-specific manure land-application plan.
- **In the event of a manure release to surface waters, call the Pollution Emergency Alerting System 1-800-292-4706**