Soil Amendments: Manure and Organic Fertilizers

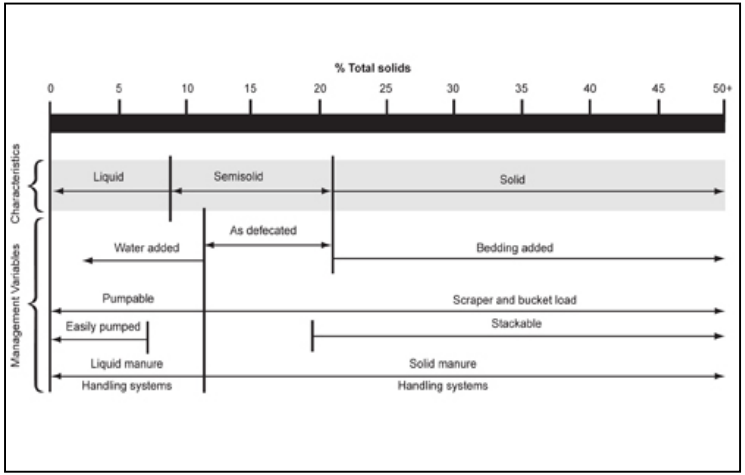
Segment 2: Manure

M. Charles Gould
Extension Educator
Agriculture and Agribusiness Institute
Michigan State University

MSU is an affirmative-action, equal-opportunity employer. Michigan State University Extension programs and materials are open to all without regard to race, color, national origin, sex, gender, gender identity, religion, age, height, weight, disability, political beliefs, sexual orientation, marital status, family status or veteran status.

What is Manure?

- The byproduct of the digestive process in ruminant and monogastric animals.
- A common and highly valued soil amendment in a cropping system.
- It can be handled as a solid or a liquid.



Manure total solids characterization and handling requirements.
Source: Virginia Cooperative Extension

Benefits of Manure

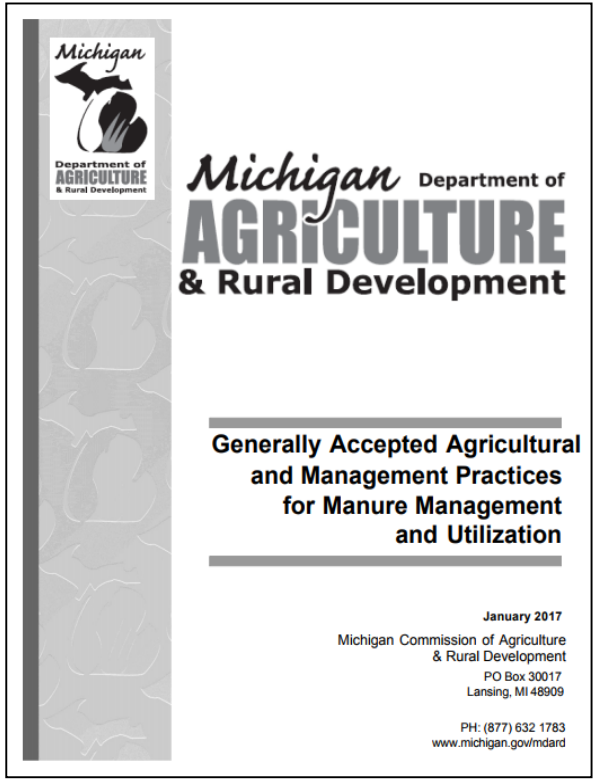
- Supplies macro- and micro-nutrients that are essential for crop growth.
- Functions like a slow release fertilizer.
- Builds soil organic matter, stimulating the biological processes in the soil that help to build fertility.
- Nutrient content varies between species, diet, and bedding content.

Manure Handling

- Manure storage and treatment sites should be situated as far as practical from fresh produce production and handling areas.
- Consider barriers or physical containment to secure manure storage or treatment areas where contamination from runoff, leaching, animal, foot, and/or equipment traffic, or wind spread is a concern.
- Consider good agricultural practices to minimize leachate from manure storage or treatment areas contaminating produce.
- Consider practices to minimize the potential of re-contaminating treated manure.

Manure Application

- Land application is an approved method for manure management.
- Generally Accepted Agricultural and Management Practices for Manure Management and Utilization (Manure GAAMPs).



Manure Application

- A farmer complies with the intent of the Michigan Right to Farm Act when a Manure Management Systems Plan is developed, implemented, and sufficient documentation is provided to prove the plan was followed.
- Application rate is determined by soil test, amendment analysis, realistic crop yield, and soil type.
- Manure Management Systems Plans focus more on nutrient placement and movement rather than pathogen control.
- Produce Safety Plans focus on pathogen control.

Food Safety Considerations

- Raw manure can never come in contact with the harvestable portion of the crop or harvested produce (FSMA PSR).
- Applications of raw manure should only occur:
  - Two weeks prior to planting
  - A minimum of 120 days prior to harvest for crops in contact with soil.
  - A minimum of 90 days prior to harvest for crops not in contact with soil.
- Raw manure must be incorporated within 48 hours of application.
- Raw manure should not be applied on commodities typically eaten raw that are harvested within 120 days of planting.
- Maximize the interval between raw manure application and harvest.

Food Safety Considerations

- Treatments that may reduce pathogen levels:
  - Passive treatment – relies on the passage of time in conjunction with environmental factors that help reduce pathogens such as UV, moisture, and temperature fluctuations.
  - Active treatments – require more management and inputs. Includes pasteurization, heat drying, anaerobic digestion, alkali stabilization, aerobic digestion, or some combination.
- Also consider how manure may enter a field from other sources, and plan accordingly.
  - Adjacent field practices can have an affect on your produce.

Recordkeeping

- Document what, where, when, how, and how much was applied.

Photo credit: Charles Gould

Tilling surface applied liquid hog manure into the soil.

Corrective Action Plan

- What happens when:
  - Accidental contact with harvestable portion of the crop
- Some options:
  - Alternative markets
  - Kill step

Corrective Action Plan

- What happens when:
  - Accidental contact with harvestable portion of the crop
- Alternative markets
- Kill step

Key Points

- Manure is an excellent slow release fertilizer and soil builder.
- Locate manure storage and treatment areas away from fruit and vegetable production areas.
- Land application of manure is an acceptable practice for fruits and vegetables if recommended and Produce Safety Rule practices are followed.
- Manure can be treated to reduce pathogen load.
- Document what, where, when, how, and how much manure was applied.
- Manure has little perceived monetary value.

Contact Information

Mr. Charles Gould
Extension Educator – Agricultural Bioenergy and Energy Conservation
Agriculture and Agribusiness Institute
Michigan State University

12220 Fillmore St, Suite 122
West Olive, MI 49460
Toll Free: (888) 678-3464, Ext. 68829
Direct Line: (616) 994-4547
Cell Phone: (616) 834-2812

Bioenergy Training Center http://fyi.uwex.edu/biotrainingcenter/
Michigan State University Bioenergy http://bioenergy.msu.edu/
MSU Extension www.msue.msu.edu