

Soil Amendments: Manure and Organic Fertilizers

Segment 2: Manure

M. Charles Gould

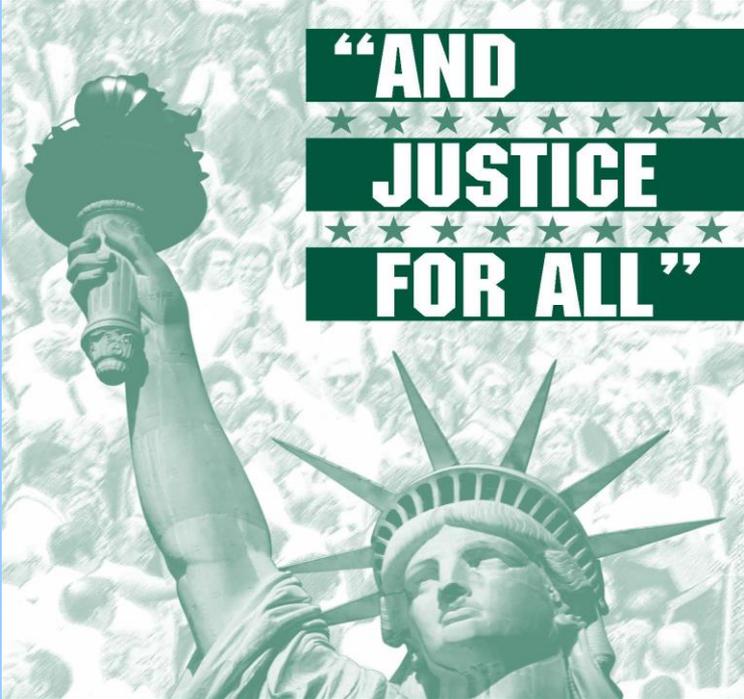
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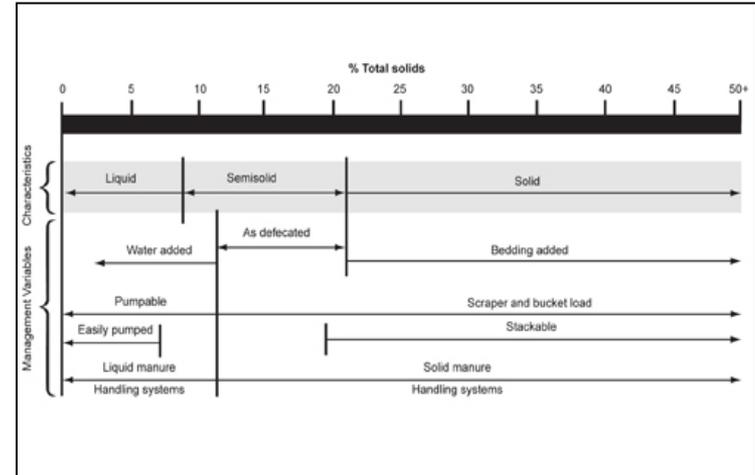
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Form AD-425-C (Revised 9/2006)

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.



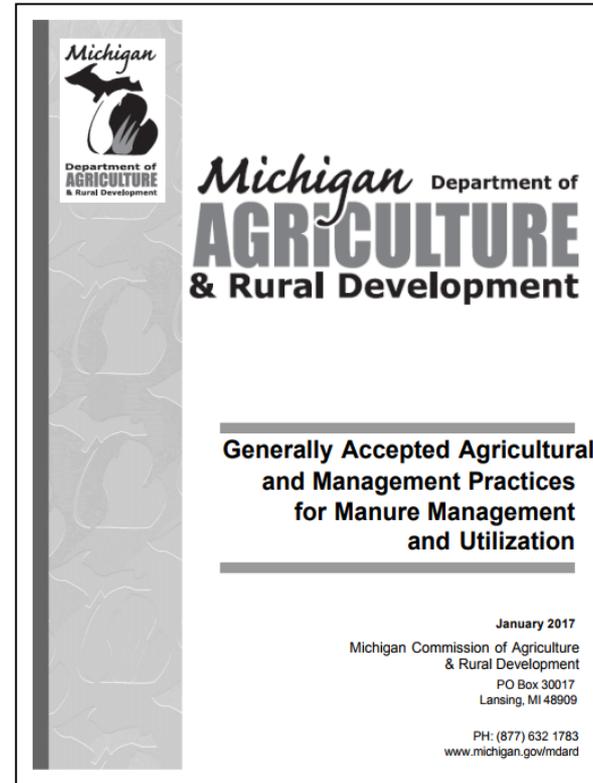
Manure Handling

- 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

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 - 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.



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