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The “Scoop”: on Livestock Manures as a Source-Regulations and Responsibilities
Michigan State University
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WHOSE RESPONSIBILITY ?

LIVESTOCK and POULTRY WASTE

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In Cooperation With:

Michigan Department of Agriculture
Michigan Water Resources Commission
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Soil Conservation Service - USDA
Agricultural Stabilization and Conservation Service - USDA

WHOSE RESPONSIBILITY ?

LIVESTOCK and POULTRY WASTE

*Prepared by staff members of the agencies listed below
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Sources of Information and Help

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THE PURPOSE OF THIS PUBLICATION is to provide some answers to questions in regard to pollution and pollution control for livestock and poultry wastes. No single agency or group can answer all the questions that might be asked. There is, however, a cooperative effort among those listed elsewhere on this page to provide information and assistance to farm operators in Michigan. The responsibilities of these organizations in areas of enforcement, service and education are explained in the following questions and answers. The numbers in parenthesis are cross referenced to related questions. The term *livestock wastes* in the following questions and answers includes poultry wastes.

If additional information is needed, the best place to start is at the local level—the county agricultural agent, SCS Office or ASCS Office. Many questions can be answered locally. Information can also be provided in regard to state agencies with no local representatives.

1. What Is Pollution?

A general definition for pollution would be “the addition of something to the water, air or soil that degrades its quality”. The degree of pollution varies with the type and amount of pollutants added to the water, air or soil.

Michigan Law says:

- a. **Water pollution:** It is unlawful for any person directly or indirectly to discharge into the ground or surface waters any substance which is or may become injurious to public health, safety or welfare or which will impair or prevent the use of those waters by others or which is or may become injurious to plant and animal life or which impairs the value and utility of property. Sec. 6A—Act 245, Public Acts of 1929 as amended. (6, 7)
- b. **Air pollution:** Air pollution is the presence in the outdoor atmosphere of air contaminants (dust, fumes, gas, mist, odor, smoke, vapor or any combination thereof) in such quantities and characteristics and under such conditions, circumstances and duration which are injurious to human life or property or which unreasonably interfere with the enjoyment of life and property, and which are reasonably detrimental to plant and animal life in this state. Sec. 2C—Act 348, Public Acts 1965. (9)

2. What Are Common Pollutants From Agriculture?

Animal wastes, animal odors, agriculture chemicals and soil sediment can be major sources of pollution from agriculture. Other sources of pollution can be dead animals, fuels, trash, garbage, soil particles, smoke and noise.

3. Do All Animal Wastes Cause Pollution?

No. Animal waste material must get into surface or ground waters, and odors into the air to cause pollution. Animal waste where used properly becomes a valuable resource by supplying plant nutrients when properly incorporated into the soil.

4. How Do Animal Wastes Cause Pollution?

The water pollution potential of animal wastes relates primarily to the following four factors:

- a. **Organic-oxygen consuming substances:** These can deplete stream-dissolved oxygen resulting in injury and death of fish and aquatic life.
- b. **Bacteriological quality:** High levels of coliform and other bacteria can render surface waters unsuitable for contact recreation, may affect its use for livestock and other water supply use, may affect ground water well supplies.
- c. **Suspended solids:** These can create excessive turbidity, discoloration and sludge deposits in a stream, affecting its use for recreational, agricultural and other uses and may be injurious to the fish and aquatic life in the stream.
- d. **Nutrients:** The fertilizing effect of such wastes can enrich surface waters to the point of creating nuisance growths of aquatic plants and weeds; nitrogen may injuriously affect water supplies. Nitrate nitrogen levels over 10 ppm (parts per million) can render a domestic water supply unsafe. Odor is the most common air pollution problem.

5. Can Any Animal Waste Material Enter Surface Or Ground Waters Without Causing Some Pollution?

The answer is generally no. Some streams have the ability to assimilate a limited amount of pollution—however, with today's livestock operations, the only practical and positive approach to water pollution control is to protect surface and ground waters from all animal wastes.

6. What State Agency Determines When Unlawful Water Pollution Is Taking Place?

The Michigan Water Resources Commission (WRC) has statutory responsibility over the control of pollution of surface and underground waters of the state. It is empowered to issue orders to abate unlawful waste-water discharges. The Commission's orders are enforceable in the courts. (1a)

7. What Agency Is Responsible For Protecting And Maintaining Water Quality In Michigan?

The Water Resources Commission is empowered to establish such water quality standards for lakes, rivers, streams and other waters of the state in re-

lation to the uses to which they are or may be put as it shall deem necessary, and has authority to make regulations and orders restricting the polluting content of any waste material or polluting substance discharged or sought to be discharged to any waters of the state. Sec. 5, 7, and 8b—Act 245, Public Acts 1929 as amended.

8. What Services Are Available From The Water Resources Commission To Livestock Farmers?

The Commission's technical staff is available for consultation and advice on prevention of water pollution problems arising from livestock operations and explanation of specific requirements applicable to a particular operation. (The technical staff are members of the Water Quality Division, Michigan Department of Natural Resources.)

9. What Agency Is Responsible For Determining Air Pollution And Maintaining Air Quality In Michigan?

The Michigan Air Pollution Control Commission. All investigative, technical, scientific and other services are performed for the Commission by the Air Pollution Control Section of the Michigan Department of Public Health. (1b)

10. What Services Are Available From The Air Pollution Control Section, Michigan Department Of Health, To The Livestock Farmers In Michigan?

The Air Pollution Control Section is available to provide guidance to any farmer who feels he may have a significant odor problem.

11. What Assistance Can Livestock Farmers Expect From The Soil Conservation Service, USDA, To Prevent Pollution?

The SCS can assist farmers through one of two programs. Cooperators of any of Michigan's 84 Soil Conservation Districts may receive technical assistance from the SCS. Likewise, any farmer who makes application for cost sharing under the Rural Environmental Assistance Program (REAP) is also entitled to the same type of assistance. This assistance will include (1) information on soils, (2) preliminary plans for the waste disposal system, (3) assistance with the presentation of data to the Water Resources Commission, and in many instances (4) construction drawings.

Preliminary studies provide a review of existing or potential pollution problems to develop broad guidelines for more detailed planning and cost estimates of the proposed work.

The presentation of data to the Water Resources Commission utilizes established forms and procedures which have been jointly developed by the SCS

and Water Resources Commission to provide early review and response to the farmer's inquiry.

In many instances, the SCS will prepare complete construction drawings and provide necessary assistance for the proper installation of the various system features. For livestock operations requiring extensive engineering, the farmer will only be provided with preliminary studies and cost estimates.

12. What Assistance Can Livestock Farmers Expect From Agricultural Stabilization And Conservation Service, USDA, To Prevent Pollution?

ASCS through Rural Environmental Assistance Program will cost-share with farmers for those practices which prevent or abate agricultural related pollution of water, land and air for community benefits and the public. To be assured of cost-sharing, farmers must request the practice before it is started and be approved by their local county ASC committee. The practice must also receive approval in writing from Water Resources Commission and be determined needed and practical by SCS. Sufficient funds are not available to approve all practices requested and committees have a limited cost-share per person.

13. What Assistance Can A Livestock Farmer Secure From The Michigan Department Of Agriculture?

The Michigan Department of Agriculture (MDA) represents agriculture and consumers in the state government. The Director of Agriculture is a member of the Water Resources Commission, Air Pollution Control Commission and State Soil Conservation Committee. Michigan Department of Agriculture has jurisdiction over pesticide registration and sale, inter-county drains, food inspection and plant protection. Michigan Department of Agriculture cooperates with USDA and other federal and state agencies which have jurisdiction over pollution control and can assist farmers in their dealings with these agencies. *(See note on back page.)*

14. What Assistance Can A Livestock Farmer Secure From Michigan State University In Regard To Livestock Wastes?

Michigan State University has two types of assistance for livestock farmers in regard to livestock wastes.

- a. Through the Cooperative Extension Service, information to assist in planning the total facilities for handling livestock, including waste, feed, animals, labor and management, is available to livestock farmers. Also available are standard plans for different types and sizes of livestock facilities; information on soils, livestock, costs and zoning; assistance in planning

waste handling systems as well as other farming practices; and the backup of resource people from Michigan State University in the areas of Agricultural Engineering, Soils, Agricultural Economics, Dairy, Animal Husbandry, Crops, and Zoning are available from the County Agricultural Agent.

- b. Through the Agricultural Experiment Station and other research programs new information is being developed. Close to 100 research projects on Environmental Quality and Pollution Abatement in different areas are underway at Michigan State University. A number of these research projects are in the category of animal wastes.

The most direct and closest source of information for a livestock farmer is the County Agricultural Agent and the County Cooperative Extension Office. Information is also available from various subject matter departments on the M.S.U. Campus.

15. Have Agencies Of The State Established Regulations For Control Of Wastes For Different Types And Sizes Of Livestock Operations?

No. Michigan Legislative Acts have created commissions and through these commissions have defined water and air pollution. Agriculture has not been singled out for specific regulations. The Water Resource and Air Pollution Control Commissions have the opportunity and responsibility of applying control measures to best control specific problems. Staffs of these commissions are glad to consult with individuals on specific problems.

16. Are There Conditions Which Greatly Increase The Potential Of Pollution By Livestock Wastes?

Yes, these conditions are:

- High concentrations of livestock or poultry.
- A livestock facility located very close to an open waterway or with a direct slope to a waterway.
- A livestock facility with residences close by.
- A major expansion of a livestock facility.
- A livestock facility which does not have sufficient land disposal areas.
- Spreading of wastes of frozen ground.

17. Should Livestock Wastes Be Disposed Of On The Land?

Yes, where possible. Livestock wastes are rich in organic substances and nutrients, making land and crops the best choice for disposal and utilization of the wastes. Research has shown that most soil types can receive about 30 tons of livestock wastes per acre per year without danger of depressing crop production or causing ground water pollution. Manure should be spread at times and at locations where it will not wash into streams or waterways.

18. How Much Livestock Waste Should Be Placed On Crop Land?

Research at Michigan State University has shown that 25 to 30 tons of animal wastes per acre do not cause a depression in crop production or provide excessive nitrogen that results in leaching. The table shows approximate land requirements for waste disposal based on 30 tons per acre and acres required for feed production. Where available land is required for feed production, management practices must be developed to permit waste disposal at suitable times.

Retention and disposal of runoff from high density animal feedlots requires special consideration.

Manure as defecated weighs approximately 8 pounds per gallon. Although there will be some variation in density of liquid manure the following conversions can be used for estimating the weight and volume:

- 1 gallon liquid manure weighs 8 pounds
- 1 cubic foot (7 1/2 gallons) weighs 60 pounds
- 250 gallons weigh 1 ton

Approximate Land Requirements For Waste Disposal And Feed Production

| | Cow (1,200 lbs.) | Steer (500 — 1,100 lbs.)+ | Hog (50 — 215 lbs.)+ | Poultry 1,000 hens |
|---|---------------------|---------------------------------|----------------------------|-----------------------|
| Waste produced— tons per year | 15 | 8* | 1/2* | 45 |
| Acres needed for disposal at 30 tons per acre | 1/2 | 1/3 | 1/60 | 1 1/2 |
| Animal units per acre (waste disposal) | 2 | 3 | 60 | 2/3 (650 hens) |
| Feed per animal | 6T hay or equiv. | 6T corn silage or equiv. | 12 bu. corn | 1,200 bu. corn |
| Acres required for feed production | 1 1/2-2 | 1/3-1/2 | 1/7 | 12-14 |

* Produced during period of gain

+ 600-lb. gain

+ 165-lb. gain

19. What Methods Of Waste Disposal Can Be Used If Livestock Wastes Cannot Be Directly Returned To The Land?

Methods for complete disposal and stabilization of livestock wastes, other than land surface disposal, are limited due to the volume of wastes that must be handled and the costs required to do so. Even partial reduction of wastes prior to land disposal can increase the cost of handling wastes substantially. The methods are:

a. Complete stabilization

- 1) *Drying*—present use limited—application increasing for poultry manure.
- 2) *Aerobic lagoon*—not practical for livestock wastes because of the large surface area required.

3) *Anaerobic lagoon*—produces undesirable odors and loading is critical for complete stabilization of organic matter.

4) *Composting*—control of temperature and moisture of material is too critical for satisfactory farm use under Michigan weather conditions.

b. Partial stabilization—system design is critical

- 1) *Oxidation ditch plus land surface disposal*
- 2) *Deep lagoon plus mechanical aerators plus land surface spray.*
- 3) *Anaerobic lagoon plus land surface disposal*—if loading is controlled to minimize odors.

20. Whose Responsibility Is It To Make Sure That Pollution Does Not Result From A Farming Operation?

It is the responsibility of each farm operator, just as it is the responsibility of a processor of products, the management of a manufacturing plant, or the governmental unit of a county or city, to develop the systems and methods of waste handling to prevent pollution from occurring.

21. What Should I, As A Livestock Farm Operator, Do To Avoid Pollution If I Continue My Operation At The Same Level For The Next Few Years?

As long as there is no direct runoff of wastes to a stream or lake, or ponding of wastes which might contaminate ground water supplies, good housekeeping and judgement in spreading livestock wastes will contribute most to the prevention of pollution. Buffer strips of grass or trees between a road, drainage way or residences improve appearances and can reduce erosion. Avoid spreading manure on hot, humid days, late in the afternoon or when there is danger of it washing and accumulating in low spots or ditches. Except in low density grazing situations, livestock should not be permitted access to a flowing stream.

22. What Should I As A Livestock Farm Operator Do To Avoid Pollution Problems If I Plan A Major Expansion Or Plan To Build A New Facility?

Site selection and land area for waste disposal are two important considerations. A good plan for the total livestock facility is very desirable. Contact the state agencies and the Cooperative Extension Service for information.

The Water Resources statute requires all persons desiring to make a new or substantial increase in use of the surface or ground waters of the state for disposal of waste water to file a written statement with the Commission setting forth the proposal. Sufficient detail should be included to permit the Commission to make a determination as to what, if any,

restrictions on the use may be necessary to prevent unlawful pollution. Data as to the type and number of head, site size and location, and a sketch showing location of residences, drainage ways and streams should be included. Sec. 8b—Act 245, Public Acts 1929.

An air use permit may be required from any livestock operator planning a major expansion or a new facility of a magnitude that might be a potential odor problem. The odor potential depends on animal concentration, location and type of waste disposal system. Contact the Air Pollution Control Section for guidance.

23. Can I, As A Farm Operator, Be Sued By A Private Citizen For Pollution?

Yes. Act 127, Public Acts of 1970, permits any person or group to bring an action in the circuit court for declaratory and equitable relief against any other person or legal entity for protection of air, water and other natural resources from pollution, impairment or destruction. The court may grant temporary and permanent equitable relief, or may impose conditions on the defendant that are required to protect the air, water and other natural resources.

24. Will Every Farm Be Inspected For Pollution Practices?

No. Inspections are made on a request basis or complaint referral basis.

25. Are Livestock Wastes The Only Source Of Agricultural Pollution?

Although this publication is limited to a discussion of livestock waste control, it should be recognized that other agricultural activities can contribute to environmental pollution such as erosion of land and silting of waterways and the improper use of agricultural chemicals which may pollute ground and surface waters.

26. Are There Acceptable Systems Now Available For Disposing Of Animal Wastes?

Several systems can be used for animal waste disposal from medium or large livestock operations. These systems may involve more land area, a change in management practices and more facilities, or perhaps only a recognition of practices to avoid pollution.

- a. **Surface disposal**—approximately 30 tons of manure per acre spread on fields where there is no possibility of flushing to open stream. This can be either solid manure or liquid manure if odor is not a limiting factor.
- b. **Land disposal**—with surface injection of liquid manure to eliminate field odors. Application rate would be approximately 30 tons per acre. Management would be necessary to have land available for disposal at right times of year. Increased holding capacity for liquid manure might be required.
- c. **Deep lagoon with mechanical aerators, and land surface spray system**—Such a system would have to be designed for a specific livestock situation and costs would be substantial; however, it might be a way to stay in business at a particular location.
- d. **Surface disposal of solids by conventional equipment, with a retention pond and land surface spray unit for lot runoff.**
- e. **Oxidation ditch for partial decomposition of organic matter and odor reduction plus land surface disposal of effluent.**
- f. **Stacking of manure with subsequent distribution on land as soon as possible. Care must be taken to prevent leaching and runoff.**

27. Are There Other Regulations — Local, State Or Federal — That Apply To Livestock Waste Disposal?

There may be. The best source for this information is your local offices—Cooperative Extension Service, SCS or ASCS.

NOTE: With reference to Question No. 13, the Michigan Department of Agriculture has jurisdiction also over milk and milk products production and animal health. The department also assists farmers in their dealings with agencies concerned with control of water and air pollution.

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