



What Is A Waste Management System?

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Introduction

A farm manure handling facility is a system for managing animal waste. In other words, it is a set of interdependent components working together to perform a task. The components are interdependent because one can't change one part of the system without affecting all the other parts. People deal with systems every day. An automobile is a mechanical system. Its task is to get one where he or she needs to go. The transmission is a component (or a subsystem) of the automobile system. The engine will still run without the transmission, but the car will not move. The manure handling facility, like the automobile, is also a set of interdependent components.

The Waste Management System's Task

The animal waste management system's task is to satisfy three "clients." The first client is the environment. The manure handling facility prevents the farm from contaminating air, soil, or water. The second client is the public. A well-managed system means the neighbor shouldn't have a reason to complain about odor, noise, or the appearance of a farm. The third client is the producer. The waste management system should make a producers job easier, not more difficult.

If all three clients are satisfied, one will increase economic return, which means more money. Figure 1 shows the relationship among the three "clients." The double-headed arrows illustrate how the clients and the system influence each other. For example, the system can impact the environment, and the environment can impact the system. Temperature, rainfall, and wind all affect how the system operates. Remember, the

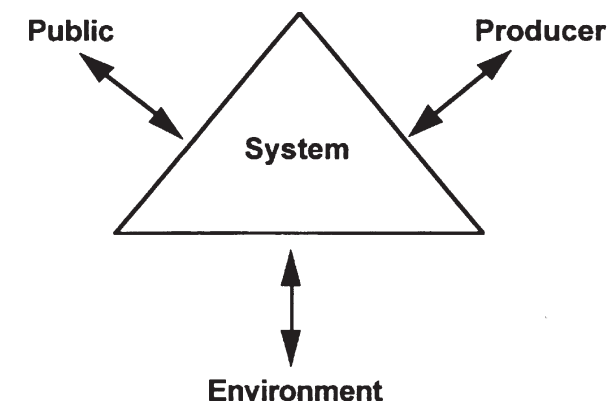


Figure 1. Three "clients" of a waste management system.

producer, has the largest responsibility and impact on the system.

How The Waste Management System Performs Its Task

Figure 2 is a general schematic diagram for manure handling facilities. The boxes represent components where various actions take place. The arrows represent components that transport material from one place to another. Notice that, as in Figure 1, the arrows are double-headed. This means material can flow in both directions. Using well-designed action components with properly sized transport components makes a waste management system extremely flexible. Let's look at the five components in more detail.

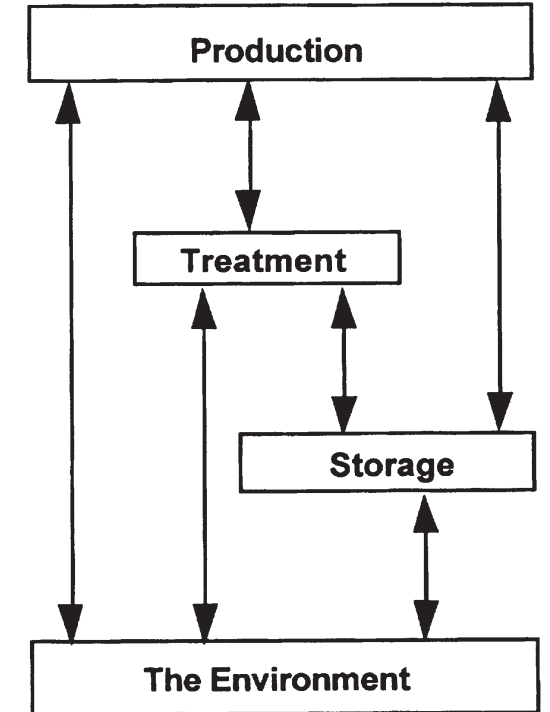


Figure 2. Components of an animal waste management system.

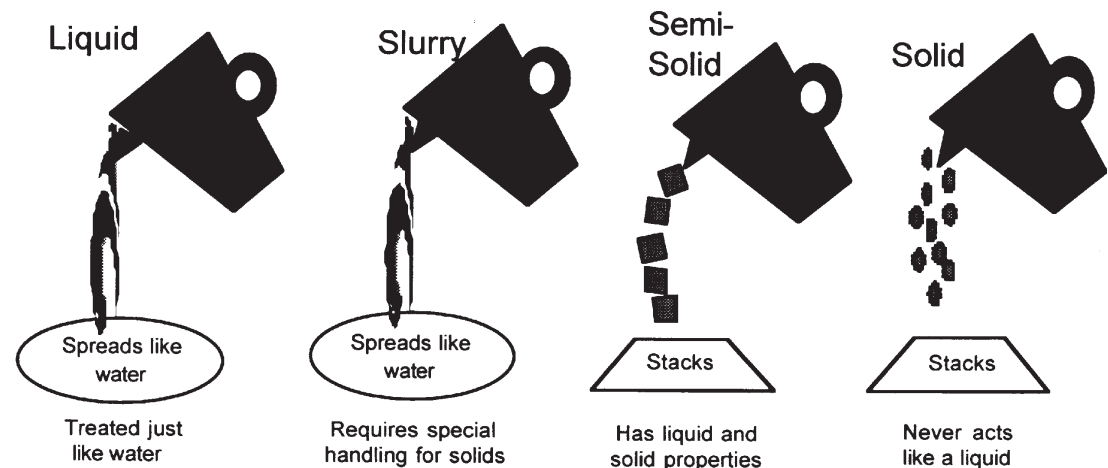


Figure 3. Manure consistency.

Production

Animals convert feed to feces and urine. This isn't the only source of waste when animals are confined. Other sources of waste include: flush water, spilled feed, bedding, leaking waterers, and captured rainfall. The non-animal sources of waste can be controlled by careful management and regular equipment maintenance.

Storage

Storage is like a shock absorber. It makes the whole operation more flexible. For instance, storage allows producers to temporarily hold material until weather and field conditions are acceptable for land application. The storage structure must also prevent waste from seeping into the soil and groundwater. Type of storage is determined by waste consistency and the intended use of the waste.

Treatment

Treatment components alter manure characteristics using physical, chemical, or biological methods. The main function of waste treatment is to reduce pollution potential. Treatment components include lagoons, composters, oxidation ditches, solid separators, and chemical additives.

The Environment

Animal manure is a resource that is too valuable to throw away. Instead, think of recycling manure nutrients and organic matter back to the environment. Land application is the primary method of recycling. Spreading manure may improve the soil's water holding capacity and may help control erosion. It also greatly reduces the amount of commercial fertilizer required to grow a crop.

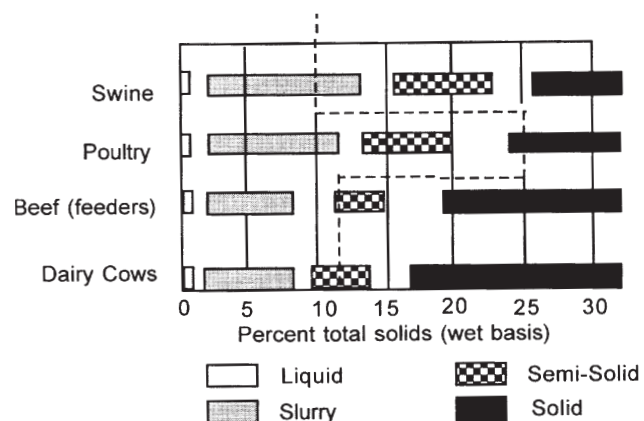


Figure 4. Manure consistency is dependent on animal type and solids content.

Transportation

Material is transported from one system component to another. For example, a flushing system moves manure from under a slatted floor to a lagoon. An irrigation system applies the lagoon effluent to a field. Waste consistency determines what equipment should be used to move material.

How Waste Consistency Affects The System

The consistency of the manure is described as liquid, slurry, semi-solid, or solid. Figure 3 illustrates these consistencies. Figure 4 shows how animal type and solids content determine manure consistency. Consistency of manure may change as it moves through the system. Feces are excreted from a pig as a slurry (10 percent TS). Adding water creates a thinner slurry (2 percent TS). A solid separator divides the flushed manure into a semi-solid (20 percent TS) and a liquid (0.1 percent TS).

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