PURDUE EXTENSION

pork industry handbook

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Managing Feed Waste

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Having waste of any kind implies that there is inefficiency, and wasting feed is a very costly inefficiency. The average feed cost on a swine farm represents approximately 60-70% of the total cost of production. Wasting 5% of feed equates to 3% of an operating budget as lost costs. A farm with an annual operating budget of $100,000 would be losing $3,000 per year to feed waste; the larger the operation, the larger the economic loss. Estimates suggest that between 2%-20% of feed is wasted on swine farms. Table 1 illustrates the cost of feed waste on a per pig basis.

Feed Waste, %	Feed for 200 lb Gain[1]	Feed Cost/ Pig, $[2]	Waste Cost/Pig, $
0	550	33.00	
2	561	33.66	0.66
4	572	34.32	1.32
6	583	34.98	1.98
8	594	35.64	2.64
10	605	36.30	3.30
16	638	38.28	5.28
20	660	39.60	6.60

Table 1. The cost of feed waste. [1]Gain from 50-250 lb assuming a 2.75:1 feed conversion ratio. [2]Average feed cost was set at $0.06/lb of feed.

Another important problem associated with excess feed waste is unnecessary addition of nitrogen, phosphorus, and other nutrients into the swine waste storage system. With a 5% level of feed waste on a swine finishing farm, an additional 0.72 lb of nitrogen and 0.18 lb of phosphorus per pig produced may be added to the manure handling system. Well-managed swine farms make prevention of feed waste a routine objective for both economic and environmental reasons.

Minimizing feed waste makes good business sense, and in many cases, it can be accomplished with minor changes in management practices. Any practice that reduces the amount of feed necessary to put on a pound of animal gain can reduce feed waste. Simply put, the less feed manufactured, transported, stored, and fed, the less opportunity for waste. Any improvements in feed efficiency, whether at the animal level or the manufacturing level, will reduce waste. This fact sheet outlines management practices that can reduce feed waste. Implementing the most applicable practices can improve the efficiency and profitability of a swine operation.

Feed Production

The first source of feed waste is production and storage. Significant amounts of feed and ingredients are lost during ingredient processing, feed mixing, transport, and storage. Losses during manufacturing are commonly referred to as "shrink." Items contributing to shrink include dust, moisture loss, scale inaccuracies, spillage, spoilage, cleanout material, and losses due to water, insects, and rodents and bird damage. Shrink can occur at all stages of production including receiving, grinding, mixing, pelleting, storage, load-

ing, and delivery. The following is a list of management practices that can be followed to minimize shrink.

Receiving
- Check all ingredients to make sure they meet purchase specifications including weight, foreign material content, moisture, and damage.
- Maintain and service receiving equipment including scales, bins, and loading equipment on a regularly scheduled basis.

Processing and Mixing
- When possible, grind ingredients immediately before use and minimize the storage of ground
- Check and repair all mixing equipment, scales, and movement equipment for accuracy and leaks.
- Implement a dust control program by adding dust control equipment, or use a dust suppressant such as fat or water.
- Monitor pelleting conditions, equipment, and pellet quality to reduce dust, moisture loss, and fines.

Storage and Handling
- Evaluate all storage and handling equipment for water leaks into grain bins and bulk bins (Figure 1).
- Inventory ingredients on a regular schedule, and rotate stock on a first-in, first-out basis.
- Use broken bags immediately to prevent losses and mishandling.
- Dry ingredients to their appropriate moisture level, or use organic acids to prevent mold growth and contamination (see PIH-07-06-06).
- Establish a rodent control program to reduce mice, rats, insects, birds, or other rodents (see PIH-04-04-04).
- Implement security measures to prevent theft.

Figure 1. Reducing waste caused by equipment leaks can save feed and prevent rodents and insects.

Figure 2. Placing covers over feed drop spouts can reduce dust.

Transport
- If possible, weigh all trucks coming in and going out.
- Examine augers, conveyers, trucks, and other equipment for leaks.

After feed is delivered to a building or bin, the next challenge is getting it into the pig without it becoming waste. Again, equipment for moving the feed from the bin to the feeder should be checked for leaks on a regular basis. Additionally, care should be taken to minimize the dust created by moving the feed. Covers should be placed over drop spouts where possible to prevent the formation of dust from falling feed. Figure 2 shows an inexpensive cover for reducing dust.

Feeders

Pigs are messy eaters and can easily waste large amounts of feed by sorting through feed and by getting feed on their snout and face only to lose it when moving away from the feeder. It has been estimated that approximately 3.4% of feed is wasted at the feeder[1]. The design, size, and adjustment of feeders can all help control waste at the feeder.

Select a feeder that is designed to reduce waste. Feeders that allow pigs to eat upright while standing at the feeder will reduce waste by preventing the pig from backing out of the feeder to eat in a natural upright position. The lip on a feeder should be high enough to restrict spilling but not more than 8 inches. Lip heights greater than 8 inches result in pigs stepping into the feeder and wasting feed. Because eating a dry feed necessitates drinking, feeders that combine a water supply with the feeder such as wet/dry feeders (Figure 3) reduce the need for pigs to walk away from the feeder to get water. Locating a water source

near the feeder can also reduce feed waste by minimizing movement.

Another management technique that can prevent feed loss is to properly adjust the feeders. They should be adjusted so that less than one half of the feeder trough has feed exposed (Figure 4). Feeders that are set too open can result in feed sorting and stale feed, both potential sources of feed waste. Feeders closed too tightly can reduce feed intake and growth, or increase fighting. Feed agitators should be routinely checked to make sure feed is not blocking their proper function and preventing the free flow of feed.

Balancing restricted access to feed and proper feeder design is the best way to optimize pig growth and feed efficiency.

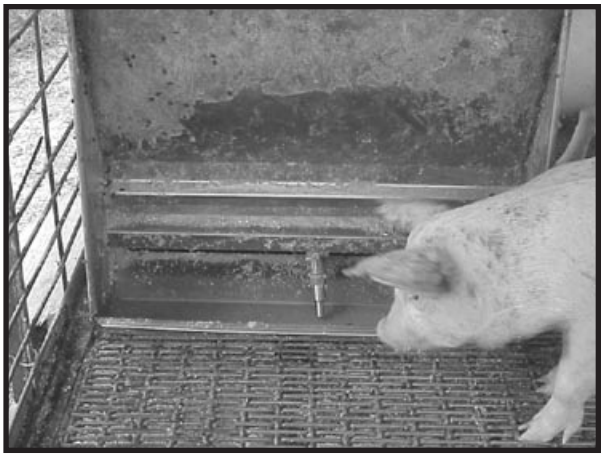

Figure 3. Using wet/dry feeders can reduce feed and water waste.

Figure 4. Feeders should be adjusted so that less than one half of the trough bottom has feed exposed.

Most feed waste among grower pigs can be attributed to fighting[2], and providing sufficient feeder space can reduce or eliminate fighting. The proper number and size of feeder spaces is directly related to the amount of time pigs spend at the feeder and the size of the pigs. Generally, there should be one feeder space for every 9-16 pigs in a pen[2]. If water is available at the feeder, then pigs per feeder space must be increased because pigs will spend more time at a feeder eating each trip and will frequent the feeder fewer times a day, which results in a reduction in total time at the feeder[2].

If feed is on the floor, then obviously, the goal of getting feed into the pigs is not being accomplished and action should be taken. For practical purposes, if there is a significant amount of feed on the floor around a feeder, then the feeder should be tightened or the feeder should be replaced. Conversely, if pigs appear to be working too hard for feed and pig fighting at the feeder is high, then feeders should be adjusted to allow more feed in the trough or more feeder space is needed. Reviewing Table 1, it is easy to see that replacing a broken or hard to adjust feeder can quickly pay for itself if feed wastage can be reduced. Routine observation of the pigs and feeders and regular attention to details is necessary to minimize feed waste at the feeder.

Feed Form

Research has shown that feeding pelleted diets results in improved feed efficiency compared to feeding mash diets[3,4]. This feed efficiency improvement can range from 4-6%. Pelleting has been shown to improve nutrient utilization as well as reduce feed sorting by pigs, both of which can improve feed efficiency. Pellet quality can also affect feed efficiency and feed waste. Fines levels in pelleted feed of 12% or higher can reduce feed efficiency[5]. If pelleted diets are used, care should be taken to minimize pellet damage during handling and transport to preserve the efficiency benefits of pelleted diets compared to mash diets.

Processing feed ingredients to an optimal particle size improves feed efficiency and reduces waste. Grinding grains to between 600-800 microns can result in improved nutrient utilization and reduced waste (see Figures 5a and 5b). Grinding to smaller sizes increases the incidence of gastric ulcers and reduces performance. Smaller particle sizes also result in increased feed waste in the form of dust. Bridging of feed in feeders, feed handling systems, and storage equipment can also occur with particle sizes smaller than 600 microns. Particle sizes larger than 800 microns can result in reduced nutrient utilization and poor feed efficiency. Large particle sizes can also increase the rate of feed sorting and the wastage associated with it.

Diet Formulas

As mentioned before, improving the efficiency of converting feed to animal protein can reduce the opportunity for feed waste to be produced. Increasing the energy and nutrient density of swine diets to decrease the amount of feed necessary for pigs to consume in order to meet their requirements is an effective way to reduce feed waste. Adding fat to diets is one way of increasing the energy density of diets and improving feed efficiency and reducing feed waste. For each 1% of fat added to a grower/ finisher diet, feed efficiency will be improved by approximately 2%. Fat additions can also reduce the formation of dust, which is another source of feed waste. Many producers routinely add fat at 1% of the ration to reduce dust.

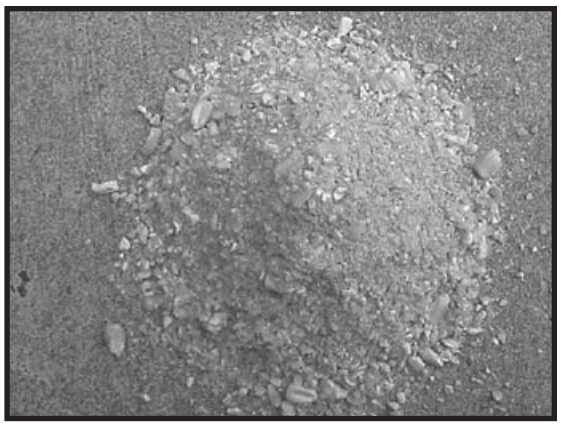

Figure 5a. This sample has a particle size over 1,000 microns.

On the other hand, formulating diets with ingredients with a high fiber content can result in increased feed consumption and more opportunity for the production of feed waste. Generally, diets high in fiber are low in energy density. Therefore, pigs need to consume more feed to meet their energy requirements and will spend more time at the feeder. More time at feeders can equate to increased opportunity for wasting feed. However, because there may be cost advantages to using diets higher in fiber, producers should weigh the potential economic benefits of feeding fiber with the possibility of increased feed waste. Improving feed costs only to waste more feed may not be advantageous.

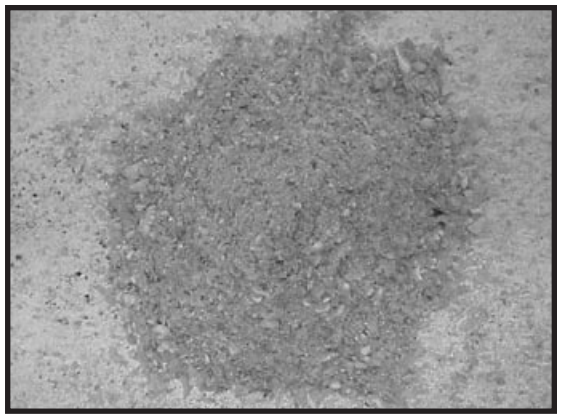

Figure 5b. This sample has a particle size of approximately 700 microns.

The goal of any nutrition plan is to supply adequate nutrients for growth without formulating deficiencies or excesses. Under or over-fortifying diets can lead to higher feed intakes and increased feed sorting. Therefore, formulating diets correctly can reduce feed waste. Similarly, using fresh ingredients in diets can reduce the problems associated with stale feed such as rooting out and sorting through the feed.

Summary

Reducing feed waste can be accomplished by identifying areas of waste and implementing appropriate good management practices such as the following:

1. Properly maintaining equipment, reducing pests, and following good manufacturing procedures.
2. Replacing worn out feeders and adjusting feeders properly on a routine basis.
3. Using processing techniques such as grinding to a recommended particle size of 600 to 800 microns and pelleting.
4. Proper formulation of diets with highly digestible ingredients and the inclusion of recommended levels of fat in the diet can improve feed efficiency and reduce dust.

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