

Poultry Waste Composting at ACE Farm: Case Study

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Who Should Consider a System Like This?

- Farms with interest in and prior knowledge of composting.
- A small- to medium-sized farm seeking an economic and environmentally friendly manure management program that will work within neighbor and regulation constraints.

Farm Information

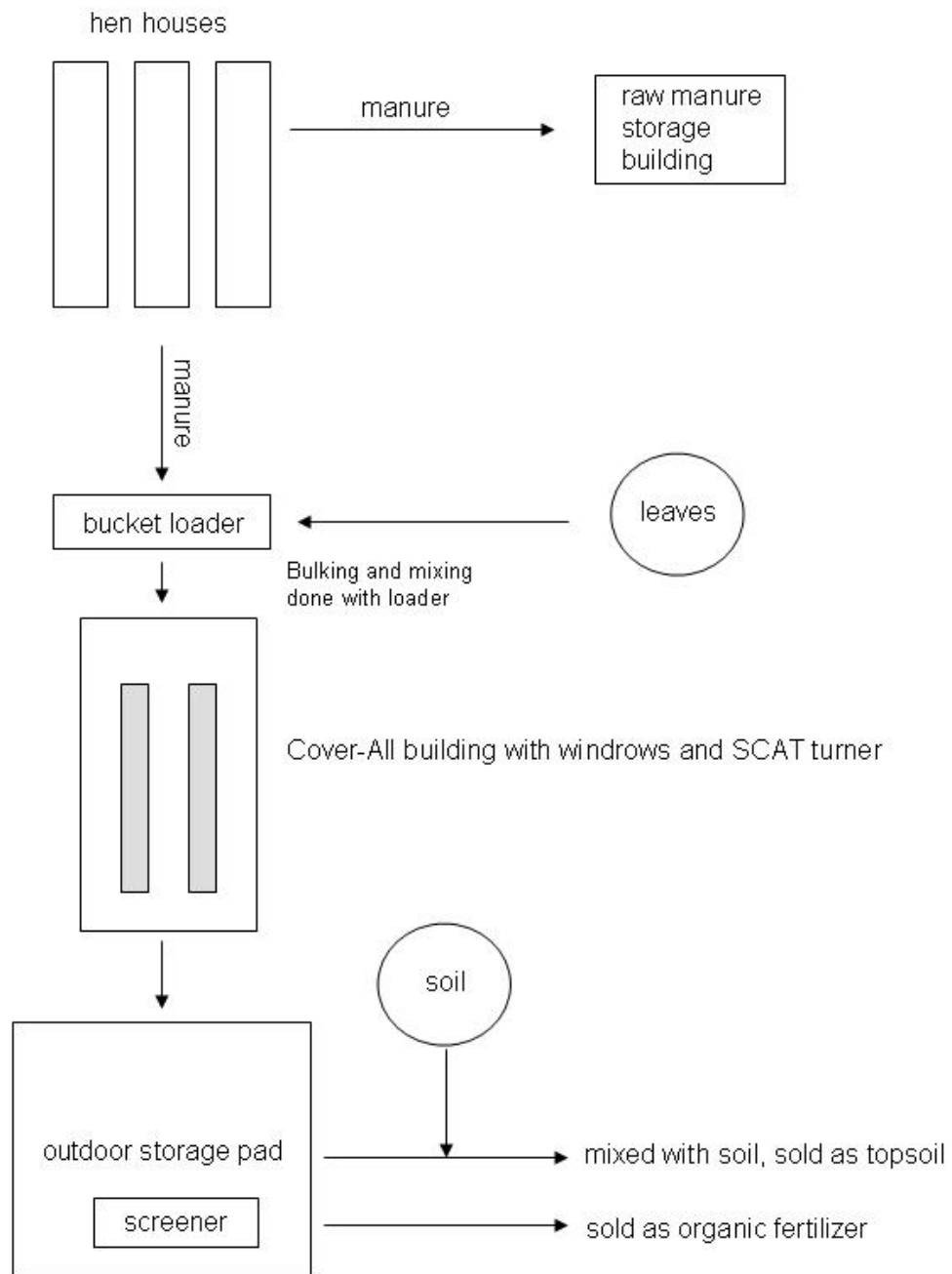
ACE Farm, founded in 1917, in Monroe (Orange County), NY is within several miles of million dollar homes. It is a family-owned and operated enterprise that houses 130,000 laying hens producing 39 million eggs annually. A by-product of the operation is over 3,000 yards of manure per year. Due to Concentrated Animal Feeding Operations (CAFO) regulations and neighbor pressure, they chose to manage the manure in an economical and environmentally friendly manner by producing and selling compost.

Why Composting?

The objectives of ACE Farm were to produce and sell dry, high quality compost while increasing their energy savings and offsetting manure-handling costs. The farm was interested in a covered system that would allow year-round production.

Composting System

The first step in building the composting facility was to demolish an existing building and use its foundation as the base of the current facility. A schematic diagram of the compost system is shown in Figure 1 below. A Cover-All building was constructed to provide an indoor composting environment. The Cover-All building is steel-framed and fabric-covered. This building houses two rows, approximately 290' x 12' x 4.5', consisting of 50% chicken manure and 50% leaves. Leaves are delivered from local towns and accepted at no cost. A 15,000 sq. ft. pad was created outside of the Cover-All building to provide additional drying and storage space. With this capacity, ACE Farm can compost 500 yards in each row totaling 1,000 yards per batch. Early in the compost process, the rows are turned and aerated as many as four times a week with a SCAT Compost Turner. This technology, manufactured by SCAT Engineering, is a hydraulic unit powered and pulled by a skidsteer. Near the end of the 10- to 12-week cycle, turning is reduced to twice a week. Compost is then stacked and cured for 45 to 60 days. After curing, compost is screened. Two end products are produced: a manure/leaf mixture, which can be used as topsoil or a topsoil amendment, and a manure-only mixture, which is a high quality organic fertilizer.



NOT TO SCALE

Figure 1. Schematic of the composting system at ACE Poultry Farm.

Environmental Benefits

The previous management practices of field spreading, outdoor composting and the use of manure as fertilizer on highly erodible fields, negatively impacted the surrounding water and soil environment. By eliminating field spreading, the current composting system prevents the accumulation of undesirable nutrients in fields and reduces odor/fly problems. It permits ACE Farm to meet the CAFO State regulations that restrict manure spreading based on field phosphorus levels. Composting manure reduces the need to plant crops on highly erodible lands in order to provide a recipient for manure fertilizers. This reduces effects on water resources by decreasing the amount of sediment, pesticides, and herbicides entering the water supply. Because manure is no longer sitting around in buildings, the fly population has been nearly eliminated, thus eliminating the need for chemicals and saving the farm \$2,000 per year. Additionally, an environmentally safe, high-quality soil amendment is being made available to landscapers, golf courses, produce farms, and others. The use of this soil amendment reduces the use of chemical fertilizers and their associated potential for water pollution. An annual savings of 58,607 kWh or \$5,400 is achieved by eliminating the 22 motors (0.5 HP each) used to run fans for drying manure.

Advantages and Disadvantages

Advantages	Disadvantages
<ul style="list-style-type: none">- Useable year-round in all weather conditions- Better management of runoff- Reduced labor costs- Drier compost results in more profitability- Energy savings	<ul style="list-style-type: none">- High salt content of compost requires dilution, either by mixing with the soil to which it is applied, or by mixing with sand or soil prior to top-dressing on turf or ornamentals.- Cost/employee time required for marketing

Lessons Learned

This project is only successful if local markets can be found for the products. As of July 2004, most of the compost is mixed with soil and sold to landscapers as topsoil for \$20 per yard. Topsoil sales for 2003 were approximately \$40,000. The price of straight compost, depending on the volume, age, and whether it has been screened or not, ranges from \$15 to \$30 per yard. Organic farming is increasing and it is anticipated that markets for organic fertilizers will also increase. Another market being explored is screened garden compost that can be sold for around \$30 per yard.

The system processing time was initially estimated to be 45 to 60 days depending on mixture composition, temperature, aeration rate and other variables. Actual processing time is significantly higher: 60 days of active composting followed by 60 to 90 days of stacked time. The long duration is due to the high salt content of the manure. Increasing the percent of leaves in the mixture reduces the salt content but reduces the amount of manure that can be processed.

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