Composting at Kreher's Poultry Farm: Case Study

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January 2004

Who Should Consider a System Like This?

- Someone with interest in and prior knowledge of composting
- Someone with the start-up capital or ideas about where to find it
- Someone with marketing skills and opportunities
- Farms with manure drier than 75% moisture

Farm Information

Kreher's Poultry Farm is a third generation family farm located in Clarence in Erie County, about 15 miles east of Buffalo, New York. The on-site composting system was initiated in 1995 with the first building, and a second building was added in October of 2000. The farm itself consists of a "laying complex" with six hen houses, housing approximately 600,000 hens, as well as a "pullet complex," two buildings with 200,000 replacement hens. The manure from all of these houses is collected and transported to the two composting buildings using a conveyor belt system, with the exception of manure from the pullet houses and one of the laying houses, which is transported by truck. The compost is kept in long windrows and turned every three days, and slowly moved lengthwise down the building.

Some of the compost is sold to local organic farmers as organic fertilizer with high nitrogen value. Prices vary seasonally, but average $50 per ton. The Krehers have 3,000 acres of organic crops, so they use the compost on their own land as well. Finally, about 2,500 tons of the compost is run through their pellet mill to create a value-added product for sale as fertilizer through various outlets.

Why Composting?

Since implementing this composting system, the Krehers and their neighbors have recognized many benefits. Removing the manure more quickly has greatly improved the air quality inside the hen houses, has decreased the fly populations, and helped to eliminate rodent breeding locations. There is no longer a need for daily spreading or storage of manure in henhouses, and the volume and weight of the final product is also reduced for more efficient storage. A final advantage of the composting system is the opportunity to export nutrients off site.

Composting System

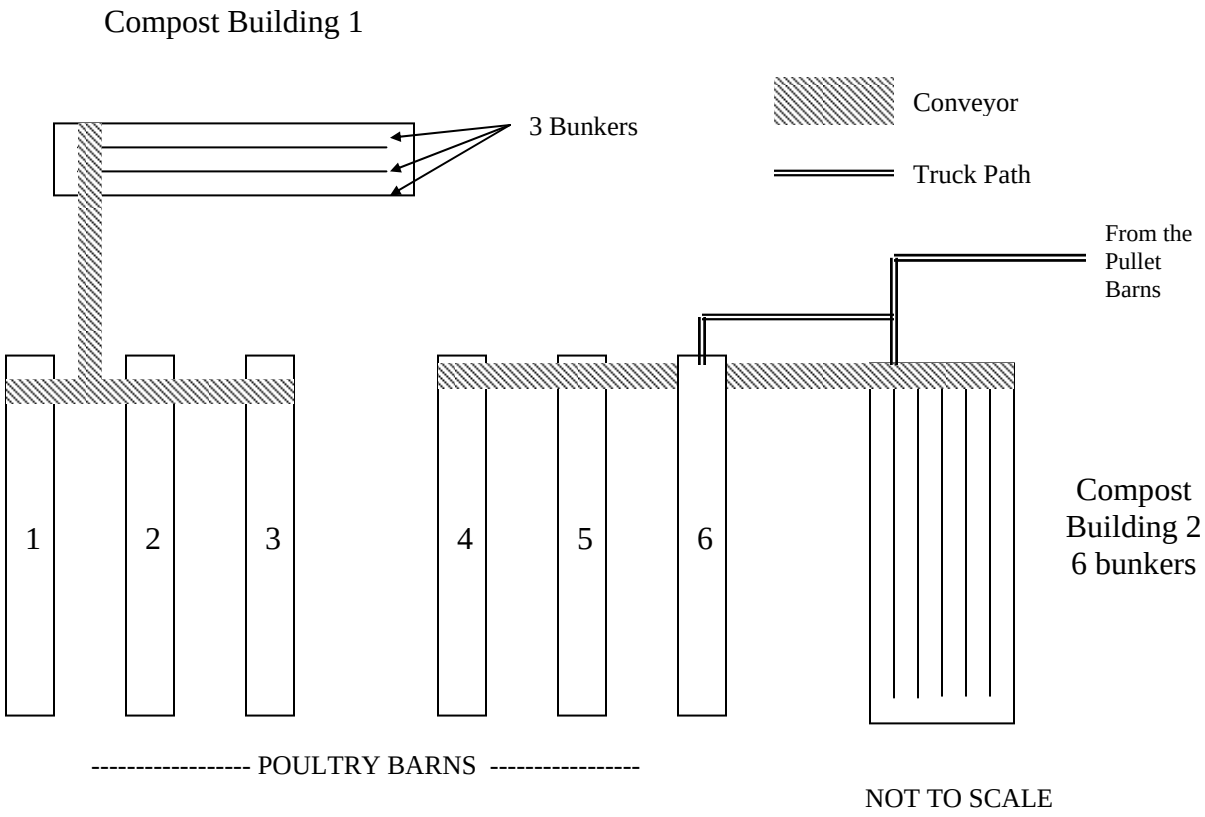

Figure 1. Schematic of the composting system at Kreher's Poultry Farm.

Process Description

The compost system is housed in two buildings. Building 1 is 66 ft. x 450 ft., and Building 2 is 100 ft. x 380 ft. Manure is delivered to each building by conveyor belts, with the exception of Barn 6, from which it is trucked in. The conveyor belts from the hen houses take the manure into the compost building, where a drag conveyor conveys it along the width of the building. Additional drag conveyors with a tapered bottom board take the manure lengthwise in the building and drop it into the first 20 ft. of the compost bunker. The first compost building has three 20 ft.-wide bunkers, and the second building has six 15 ft.-wide bunkers. Once the manure is in the bunker, an automatic, self-propelled machine is used to turn windrows. The compost is turned and moved about 20 ft. down the length of the bunker about every three days, until it reaches the back of the building 45 days later. During the composting process, the moisture content drops from the range of about 50 to 60% in the collected chicken manure, to about 15 to 25% in the semi-composted material. In this dry state very little biological activity occurs; however, if it is wetted it will continue to compost. Aeration tubes in compost building 2, made of perforated drainage pipes, are located under the floor of the bunkers from 20' to 150' in 2 bunkers and 20' to 120' in the remaining 4 bunkers. Aeration supplies oxygen to the microbes in the compost, preventing it from undergoing anaerobic decay, which produces strong odors. Typical cycle timer settings are 2 minutes on, 7 minutes off.

Economic Information

	Initial Investment	Annual Fixed Cost (annual interest + depreciation)
Compost Building	$565,893	$41,829
Corridor Building	$92,692	$8,451
Corridor and Building Fans	$5,400	$405
Belt Blowers and Tubing	$538,848	$49,257
Conveyors	$44,151	$3,992
Truck	$12,500	$1,550
Skid Steer	$18,000	$2,854
Pay Loader	$45,000	$5,063
Turning Machine	$92,692	$8,451
Total Initial Investment	$1,415,176	
Total Annual Fixed Cost		$121,851

MANURE SYSTEM		
Repairs/Maintenance, including parts and service fees		$12,000
Utilities		$15,000
Hired Labor	$15/hr	$30,000
Fuel		$6,414
Insurance		$8,000
OTHER SYSTEMS		
Fertilizer: Pellet Mill	1650 tons *$60	-$99,000
	1320 tons *$50 on farm use	-$66,000
Other	Marketed Compost - $50/ton	-$60,000
Total Annual Operating Costs		-$153,586

TOTAL ANNUAL COSTS	-$31,735

The negative total annual cost means this system will make money for the farm. A $31,735 return on a $1.4 million investment would not be considered a business return by itself, but considering the farm's need to manage the manure in a reliable manner, the costs have been found acceptable. The other benefits conform to the farm's wider business model. The spreading of odiferous, high-moisture chicken manure has been replaced by a system which allows for storage of composted manure, so that spreading can be done at more agronomically and environmentally appropriate times with less odor. Flies are also controlled, which further improves neighbor relations and the farm's image. Improved manure management is seen as part of the cost of doing business and running a first class operation on Kreher's Poultry Farm.

Advantages	Disadvantages
- Reduced volume of manure to store - Ability to store relatively stable manure product for use at agronomically appropriate times. - Improved hen house air quality - Fly and rodent population reduction - Odor control - Potential for profit from value-added products and energy savings - Market advantage of compost that can be sold or used on organic crops	- Management time and labor - High initial capital costs - Extra stress - Marketing

Who To Contact

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Acknowledgements

The authors would like to thank the New York State Energy Research and Development Authority (NYSERDA) for funding in support of this work. Any opinions, findings, conclusions or recommendations expressed in this publication are those of the authors and do not necessarily reflect the views of NYSERDA or the State of New York, and reflect the best professional judgment of the authors based on information available as of the publication date. Reference to any specific product, service, process, or method does not constitute an implied or expressed recommendation or endorsement of it. Further, Cornell University, NYSERDA and the State of New York make no warranties or representations, expressed or implied, as to the fitness for particular purpose or merchantability of any product, apparatus, or service, or the usefulness, completeness, or accuracy of any processes, methods, or other information contained, described, disclosed, or referred to in this publication. Cornell University, NYSERDA and the State of New York make no representation that the use of any product, apparatus, process, method, or other information will not infringe privately owned rights and will assume no liability for any loss, injury, or damage resulting from, or occurring in connection with, the use of information contained, described, disclosed, or referred to in this publication.