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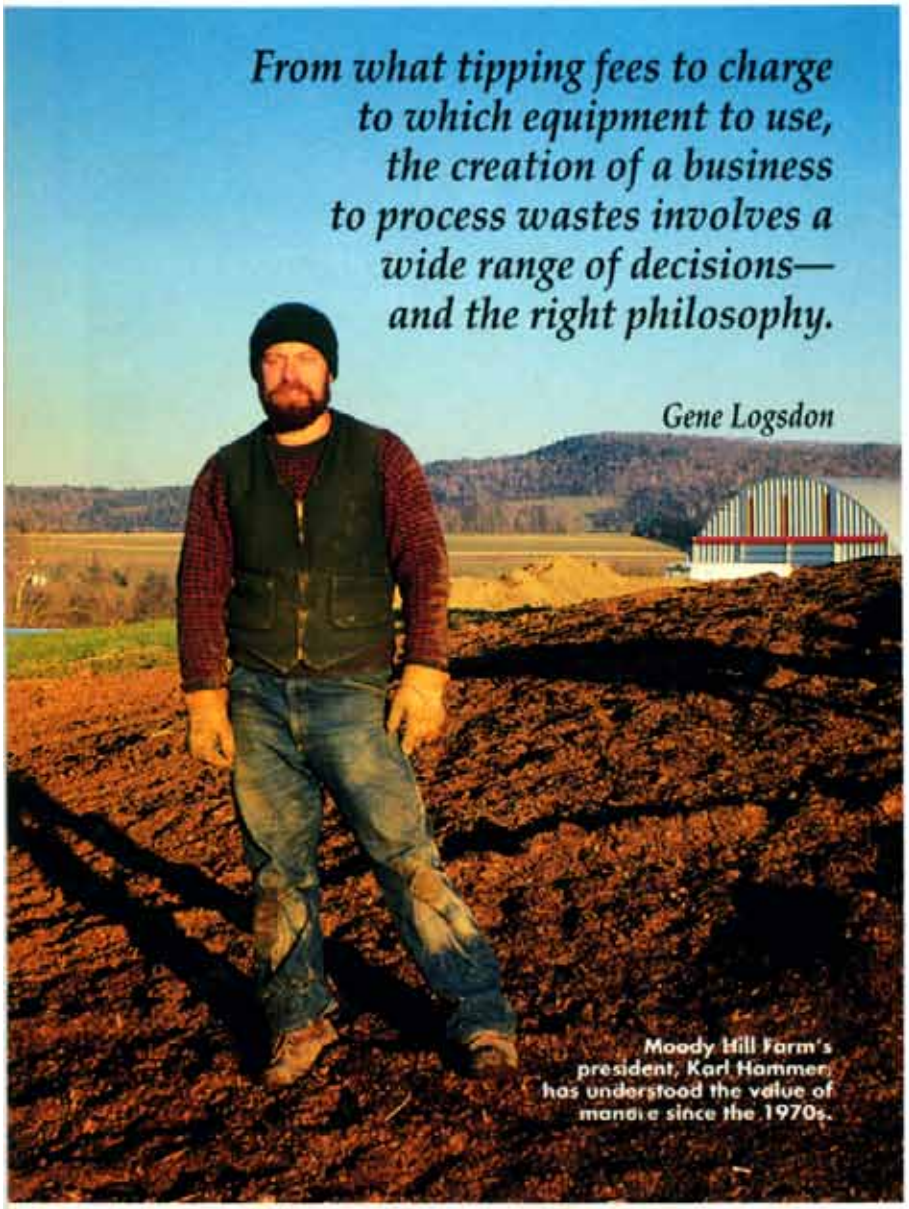
ENTREPRENEURIAL APPROACH

PRODUCING AND MARKETING MANURE COMPOST

From what tipping fees to charge to which equipment to use, the creation of a business to process wastes involves a wide range of decisions—and the right philosophy.

Gene Logsdon



Moody Hill Farm's president, Karl Hammer, has understood the value of manure since the 1970s.

KARL HAMMER was one of the original Seventies organic vegetable growers in Vermont. Manure, a staple of his farming operation, was hard to come by in his area, and Hammer found himself in the somewhat odd position of raising cattle and hay on which he barely broke even, just so he had manure for vegetable production. "But that manure was not a shabby profit," he recalls.

At the same time, he was growing Christmas trees which he marketed in Manhattan. Hammer's partners in that venture lived in Westchester County, New York and rode horses. Hammer learned that the major difficulty for horse fanciers in Westchester was getting rid of the manure, which was being hauled to the landfill at a cost of up to $600 for a 30 cubic yard dumpster load. Hammer understood the value of manure and his entrepreneurial spirit immediately saw an opportunity that would cost stable operators a lot less than $600 a dumpster load and help the area's agriculture and horticulture too. So was born, in 1987, Moody Hill Farm, Inc., in North East, New York, with Hammer as president and Nels Johnson as vice-president.

"We have known each other since boyhood and worked together often," says Johnson, who was a building contractor when Hammer asked him to come to work with him. "That has been a plus in working together to get this business off and running." With about a half dozen employees, Hammer and Johnson concentrate on developing and marketing quality end products from compost made with horse, cow and chicken manure and yard wastes from nearby towns.

As part of the ongoing process, they test compost handling machinery and methods while constantly refining their site design for managing leachate, odor control, and curing and drying processes. "What we want to do is perfect a model to adapt in other places and for other purposes," says Johnson.

WHERE CASH FLOW COMES FROM

Moody Hill's first source of income derives from the manure removal service itself. The company rents a 30 yard dumpster to a customer for $125 a month and charges a fee for hauling away the manure based on distance, traffic density and other factors. The materials are then mixed according to various formulae, formed into 150-foot long windrows 4 feet high, and turned and mixed further with a Scarab windrow turner.

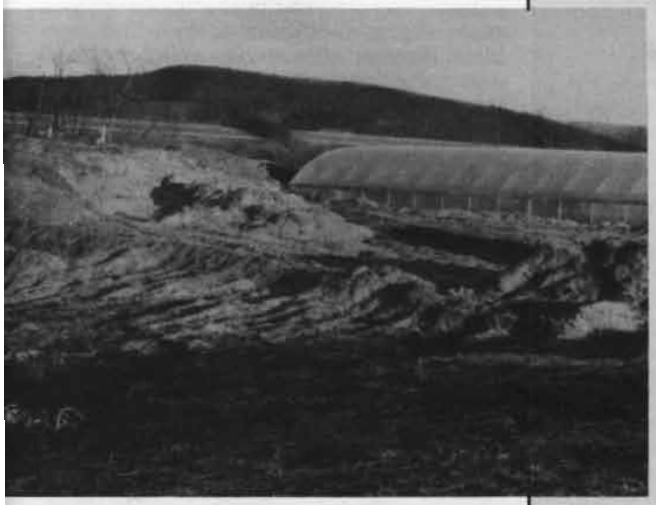
The windrows are monitored using standard testing equipment: thermometer, oxygen meter, and pH tester with the measurements kept continuously on monitoring data sheets. Samples are also sent to independent labs. "We are starting to use chromatography to test for mineral content, water carrying capacity, biological life, and other characteristics," says Johnson.

The active composting stage lasts from 12 to 20 weeks, depending on weather and other variables. The compost is then placed in

large curing windrows. Later it may be spread out for final drying. A bulldozer and a front-end loader are used to move the material. The final product is screened, and then bagged or shipped in bulk, or blended with other materials.

Groundwater is monitored constantly. Runoff controls include clay-lined holding ponds, rock filters, back-up pumps and sod beds. Cornell scientist Tom Richard brings farmers from all over the state to view the operation, which he considers an excellent example of environmentally sound composting. (See accompanying report.)

Compost itself is the main product marketed—by the bag or in bulk—to retail garden centers, landscapers, conventional farmers and organic farmers. Prime quality screened compost sells for $25 per cu. yd. with discounts on volume. A forty pound bag sells for $2.10 currently and a 25 pound bag for $1.45. Landscapers use it mainly in bulk as topdressing on lawns and golf courses, for lawn construction and around plantings. Gardeners generally buy by the bag for the same purposes and as a soil amendment in their gardens. "Yes, we make a point of compost's fungal suppression capabilities," says Hammer. "We are selling to a couple of organic lawn care businesses already." The company is also involved in research trials on the effects of compost extracts in the suppression of apple diseases, principally scab. The original work was done at the University of Bonn in Germany and now, funded in part by the Low Input Sustainable Agriculture program, Moody Hill is supplying the compost for apple replant experiments.



A greenhouse constructed on a large pile of manure captures heat in an attempt to extend the growing season for vegetables.

"We focus not on compost as simply an alternative fertilizer, but as a major component of a new agricultural practice and alternative landscaping and greenskeeping," says Johnson. Part of their marketing strategy is to impress upon customers the hidden value of high quality compost. "High quality compost is a completely digested, earthy material which has the properties of humus," explains Hammer. "Humus is the more or less stable fraction of the soil organic matter that remains after the major portion of added plant and animal residues have decomposed. It acts as a site of nutrient absorption and exchange for plants, allowing them to 'choose' which nutrients they need to balance their own inner chemistry. The beauty of this process is that humus allows this exchange while at the same time preventing excessive nutrient losses." He cites work by Will Brinton (Woods End Laboratories) which indicates that nitrogen loss from composted manure is only 9.1 percent compared to 22.6 percent for fresh manure and 24 percent for inorganic commercial NPK fertilizers.

Commercial farmers buy in bulk. "You can sell only so many boutique bags of compost," says Hammer. "If we are going to

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ON-FARM COMPOSTING RESEARCH

WHILE FARMERS have been composting for thousands of years, large scale agricultural composting is a new phenomena in the United States. Operations like Gerster's and Moody Hill Farms are breaking new ground, and as with any new enterprise, there is a lot to be learned. The New York State Department of Agriculture and Markets is currently funding two projects in which Cornell University is cooperating with six existing farm composters to evaluate the pro's and con's of agricultural composting and pass that information on to other farmers.

The first study, titled "Agricultural Composting: A Feasibility Study for New York Farms," focuses on operations. The goal is to answer the key questions farmers need to consider: What equipment is required? How much time does composting really take? And what will it cost? Professor's David Allee and Wayne Knoblauch and researcher David Kay (all in the Agricultural Economics Department) are addressing the economic issues, while Professor Joe Regenstein (Food Science) and Tom Richard (Agricultural and Biological Engineering) are evaluating the technical aspects. All the cooperating farmers have been generous in sharing their hands-on knowledge so that the others can learn from their experience.

The second study, "Agricultural Composting: Environmental Monitoring and Management," focuses on water quality issues. Professor Mike Walter, graduate student Ellen Rymshaw, and Tom Richard are monitoring both surface water and infiltration at five of the farm composting sites. Parameters of concern include nutrients (especially nitrogen) and biochemical oxygen demand (B.O.D.). The researchers are working the cooperating farms to evaluate low cost runoff control measures to protect water quality. Options being tested include vegetative filter strips and runoff recirculation systems.

With these two projects the Department of Agriculture and Markets is providing almost $80,000 to encourage agricultural composting activities. In-kind contributions from Cornell and the cooperating farmers more than double that amount, all of which adds up to a major investment in farm composting in New York State.

Results from both studies will be available in December of 1991. In the interim, farmers seriously considering the composting option are encouraged to attend workshops next summer planned for each of the farms. The schedule for the workshops, as well as other agricultural composting information are available from Tom Richard at 207 Riley-Robb Hall, Cornell University, Ithaca, NY 14853.

—T.R.

COCOMPOSTING EXPANDS FARM OUTPUT

FACED with insufficient land to spread eight tons of manure each day from 300 head of Holsteins, Gerster Farms in Davenport, New York composts manure and waste wood fiber from a local company in windrows on a specially built pad. Fred Feit of Gerster Farms has found that a mix ratio of 17 to 1 (wood fiber to manure) works quite well for composting.

More recently, the farm started receiving cardboard from the county landfill (delivered at no charge). The cardboard is shredded in a corn chopper, then blown and hand-pitched into the stalls. Feit reports that the cardboard works even better than the wood fiber which has also been used as bedding. Barns are cleaned twice a day, and a front-end loader is used to form windrows. A windrow turning machine is used to aerate piles and help maintain proper temperatures for composting.

The farm is in the process of obtaining a permit from the N.Y. State Department of Environmental Conservation to take more than 3,000 yards per year of yard waste (the regulatory threshold) from communities, which would be used for bedding in the stalls, and then composted with manure. Feit sent letters to towns within 90 miles of the Delaware County farm, offering to take yard waste for $25 per ton. Acknowledging the price seemed too high for most communities who are accustomed to paying very little to dump or burn yard waste, Feit believes more towns will be interested in the farm's service as landfills are closed and open burning is restricted. He points out that one neighboring community already pays $30 per ton to get rid of its yard waste.

Gerster is planning to double the size of it herd within the next year, so Feit anticipates substantially increased need for yard waste as bedding material and bulking agent for manure compost. "We started taking wood waste and yard waste to benefit the farm, but maybe we can also benefit the region by recycling these wastes" says Feit.

Although the investment in the composting operation amounts to about $200,000 so far, Feit believes it is cost-effective. They are not planning at this point to sell compost since the farm can utilize all the compost on its own property. Therefore they do not plan to invest in compost equipment since they do not have to be as concerned with the appearance of the final product as if they were to market the compost.

Even though Gerster hired a full-time compost manager, Bill Cody, Feit figures that the composting operation saves 21 work hours per week compared to the time it previously took to spread the manure. Related benefits to the farm include the nutrient value saved by not spreading manure on frozen ground where it can be washed away, as well prevention of water pollution. — R.S.

"On first-year soils, we may advise as much as 20 to 40 tons per acre of compost to bring the land up to good organic fertility," says Hammer.

move compost in quantities that significantly address pressing waste management issues, we must provide it for use in mainstream agriculture. Compost sales alone can't support a company. A company must be profitable on tipping fees from waste generators for whom composting is a lower cost alternative."

COMPOST USE IN AGRICULTURE

Hammer believes the value of compost for agriculture is not yet fully appreciated. "Commercial composters in California are applying their product to alfalfa fields at a four to six ton per acre rate. They have learned that compost brings higher yield, higher protein analysis, and less leaf shatter than when using conventional fertilizers, and remember they are cutting alfalfa 12 times a year while we cut only three or possibly four times here. Interestingly, compost-fertilized alfalfa uses less water, a significant point for Californians. Fertilizing alfalfa with compost also adds longevity to a stand—up to 10 years where five years is usual with conventional fertilizers. Farmers are not used to figuring these values into their profit analysis. In addition, our compost contains significant nitrogen and other nutrient minerals. Also compost makes a good carrier for soluble fertilizers a farmer might want to apply."

Hammer generally prescribes an application of five tons per acre on hay land, but much more than that for vegetables, at least at first. "It takes two years anyway to switch from chemicals to composts," he says. "On first year soil, we may advise as much as 20 to 40 tons per acre to bring the land up to good organic fertility in a hurry." Moody Hill offers a spreading service to farmers and landscapers along with its agricultural soil consulting service and a compost system consulting service.

Moody Hill manufactures topsoil to create yet another outlet for its compost. "This market has great potential. We have a source of silt and clay that was pushed aside where a seam of gravel was mined. We will custom blend for our customers. Generally, we blend 1 part of our compost with 4 parts of subsoil to create a premium topsoil with 6 percent organic matter, superior to most agricultural soils. We also do on-site manufacturing of topsoil, incorporating an inch of our compost into the top two to three inches of subsoil. That produces a topsoil of five percent organic matter that will require no additional fertilizer during the first growing season." Landscapers

Materials to be composted are formed into 150-long windrows and mixed further with a windrow turner.

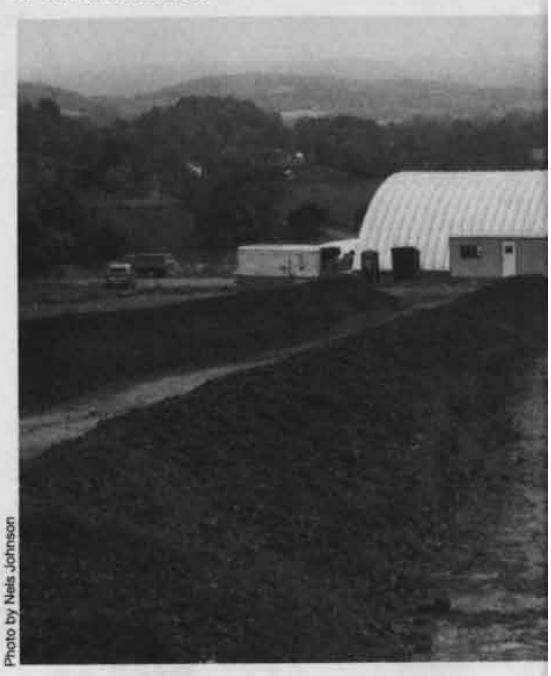

Photo by Nels Johnson

are the main market for the topsoils.

Finally the company makes and sells potting soils generally in the range of $30 to $40 per cu. yd. "Ours are acceptable for organically certified growers," says Hammer. "Our compost is generally too high in conductivity to use alone for a potting soil. We generally advise a formula of ¼ part compost and ¾ part other materials. Our organic potting soil contains, in addition to compost, peat humus, peat moss, plant materials (like bark or milled pine) and rock powders. But making potting soils is not the way to start a composting business. It should be the last product tried, after you gain expertise in compost-making. The process is not easy to learn and quality is very important. Even my partners sometimes think I'm too meticulous about quality, but I've seen customers leave us for cheaper products and I've seen them come back too. You must be prepared to work very closely with customers on potting soil mixes."

Since getting composted materials back into agriculture is basic to Moody Hill Farm's philosophy, it maintains its own farming operation in connection with the compost business–30 acres of sweet corn and eight acres of raised bed vegetables this past year. "We're very attached to the idea of combining a compost site with food production," says Johnson. "What comes out of the land should go back into agriculture, not into the landfill."

Hammer is attempting to extend the growing season for vegetables at Moody Hill by capturing heat in a greenhouse constructed on a large pile of manure. Last spring, young plants were started early in the greenhouse for transplanting outside, and produce was grown throughout summer and fall. They hope to add another greenhouse this year. "I'm not yet prepared to say that the additional heat captured has extended the growing season in the greenhouse," said Hammer. Future experience will determine if this is an added benefit extracted from decomposing manure.

Moody Hill has had to contend with some strong neighborhood opposition to its composting, but a favorable article in *The New York Times* has helped considerably to assuage local fears and bring them local support. "A lot of my time has been taken up in what amounts to public instruction about composting, and that has been time lost from the business. Many accusations flung at us were simply false. The manure does smell a little when it comes in– that's why we moved into dairy country. But it doesn't smell from any distance and once into the composting process there is no unpleasant odor. A lot of the opposition really had nothing to do with the composting operation. It's about fears over property losing value."

Long range, the company hopes to use the experience and know-how gained at its present site to establish one and possibly several more operations combining composting and food production. Hammer says that would-be commercial composters should not look upon the compost business as anything even close to a get-rich-quick enterprise. "I got into this because I'm a farmer. As a farmer I am worried about soil depletion and soil contamination. Waste management by composting presents both an opportunity to save our soil and the danger of further damaging the land from which we and future generations must eat." ■

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RUNOFF CONTROL AND GROUNDWATER QUALITY

PROTECTION of water quality is a priority at Moody Hill, as evidenced by the extensive site preparation and drainage management system. Nels Johnson, Vice President of Moody Hill Farms, explained that they enlisted the help of the county Soil Conservation Service to minimize water runoff from the composting operation.

SCS District Conservationist, Bob Dibble designed diversion ditches and a detention pond to collect leachate from a five-acre drainage area. Johnson emphasized that this new pond, constructed this fall, replaces two ponds which also controlled runoff, and that water quality protection has been part of Moody Hill operations since they started. Dibble believes that the potential adverse water quality impacts from the manure composting operation "is certainly no worse than other farms."

The N.Y. Department of Environmental Conservation and the Dutchess County Health Department, responding to initial complaints from neighbors about pollution of a stream which borders their property, worked with Moody Hill to "assist them in identifying methods to minimize pollution potential," said Lawrence Gallagher of the DEC. Even though composting of manure is exempt from DEC permit requirements, the operation is a solid waste management facility, and is subject to DEC inspections.

Groundwater impacts are also being monitored at the site through a grant to Cornell University Cooperative Extension from the N.Y.S. Department of Agriculture and Markets. A series of lysimeters for monitoring pollutants in groundwater have been installed, and samples of groundwater and surface water will be periodically analyzed.

— R.S.