SARE - Farmer Grower Grant

FNE 99284

Final Report

Project Title: DAIRY SLURRY MANAGEMENT

Project Goals

To develop a composting system that will convert dairy slurry into an acceptable soil amendment (compost).

The project goal to evaluate the feasibility of composting slurry (high moisture) manure with waste from off the farm (ground up tree trimming's, leaves, horse bedding etc.). We hope to reduce manure transportation and odor problems, develop a means to export nutrients off the farm, and develop a marketable product from animal wastes. The spreading of raw manure results in complaints from the neighbors, winter runoff, and loss of nutrients. We wish to protect the water quality of the streams and aquifers on our farmed land while maintaining a friendly relationship with our neighbors. Composting could be our most practical management option.

Farm information

The Williams farm has been in operation for 40 years and is located adjacent to the historic town of Kinderhook, NY. Carl Williams with his four brothers, plus five full time and three part time employees operate the farm. Approximately 1350 acres are farmed 850 rented and 500 owned. The primary crops are 700 acres of corn and 650 acres of hay. The herd consists of approximately 1000 head of dairy cattle: 600 adult, 150 bred heifers, 200 open heifers and 65 calves. Currently manure is spread daily, there is no long-term storage lagoon.

Project Cooperators

Carl Williams	Dairy Farm Manager
Anna Dawson	Public relations
Bob Walker	Composting Consultant

Project Results

Assortments of materials were collected over the course of 10 months. One 20 yard roll-off container was supplied to a local horse stable for bedding collection. Within a week, the box was filled potentially supplying the project with 1,040 yards of material per year. Leaves were supplied by town and private collection trucks. This is a seasonal source of materials and amounts vary. Tree trimmers were notified and encouraged to drop chips at the compost site. This also yielded a limited supply.

Keeping the various types of materials separated and developing specific recipes was difficult due to the lay out of the compost area and the way the materials arrived on site.

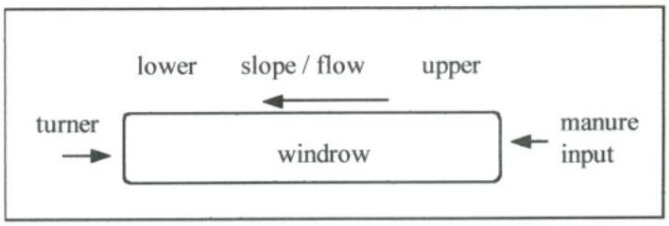
This material was formed in to four windrows 8' wide by 200' long. The windrows were composed of approximately 60% horse bedding, 13% wood chips, 13% food processing waste (cranberry pulp) %13 leaves. This height and width were determined by the tractor pulled compost turner used to blend the piles. The compost site was located on a field near the barn. This site has a slight slope 1% with the windrow running in the direction of the slope.

The application of slurry to the conical shaped windrows proved difficult. This manure also contains the milk house wash water raising it to 90% moisture. This high moisture improves the flow, making pumping and spreading easy. When applied to the windrows it flowed all over the place creating a huge mess.

In order to contain the flow a device was fabricated and attached to the rear of the compost turner. This unit created a valley in the top of the windrow 12" wide x 12" deep (see photos). The mix of carbon materials effects the structural integrity of the trough walls. As the manure flows its force may breech the wall. Windrow blends ~~witch~~ which include straw, hay, and med. to large wood chips improve the results.

The manure was delivered by driving along side the windrow with a specially constructed truck body and allowing the manure to flow in to the valley on top of the windrow. We believe a manure tanker such as the Husky or Badger could be altered to perform the same way. The manure was applied to the windrow on the up hill end. The flow rate (input) was controlled, as the valley was filled the flow continued down hill filling the valley.

The windrow turner worked its way through the pile starting at the down hill side. As the turner is operating, the manure is continually applied. When the flow meets the turner, it is completely incorporated in to the rest of the material.



Rainfall and snowmelt seriously increased the moisture level of the compost windrows. Proper composting takes place at 50-60% moisture. As the moisture level increased from nature, the amount of manure that could be added was reduced. The use of fabric compost covers could be used to protect compost piles from rainfall (maintaining current moisture levels). This would allow all necessary moisture to come from the manure. Typical moisture content of 156 yards of horse bedding and wood chip mixture is 42%. Requiring 44 yards /8,800 gallons of manure (85% moisture) to obtain the desired moisture content of 58%. When the windrow heats to 140 degrees this moisture is lost as steam when the piles were turned. The more the pile is turned the faster it dries out allowing or requiring more moisture -manure to be added in order to maintain the required 50-60%.

The ability to compost dairy manure requires a steady supply of carbon materials. In 2000, we hope to attain the bedding from three horse stables amounting to over 3000 yards per year. We are also pursuing a program to recycle paperboard into a bedding and compost ingredient.

Site Specific details

The application of liquid manure into compost windrows can benefit from the compost site having a 2-3% slope with the windrows running the length of slope. This allows the manure to be applied at the top end of the slope as the manure fills the valley it flows down hill filling the entire length of the windrow. The compost turner starts at the bottom end, working its way up as the manure flows into the rotor. This results in completely blending the manure into the carbon materials. The production of compost benefits from a working surface that will resist rutting allowing year round access.

Economics

200 yards of the compost produced from this project was sold to a local organic vegetable grower for $14.00 a yard + trucking. Local residents helped themselves to an unknown amount. The remainder was given to a local horticultural school and used on the farm.

Other compost locally produced is being sold for $30.00 a yard. We are projecting production of 3,000 yards of finished compost @ $20.00 = $60,000 farm income. Detailed economic & nutrient analysis will be produced in the coming year.

Future Developments & Will the Practice Continue?

During the coming year (2000), the project is being repeated with controlled volumes of carbon materials, and manure inputs. These windrows will be covered to prevent impacts from rainfall. The farm has received funding to install a compost pad in 2000/2001. In addition, the development of professional grade compost and potting soil products will be persued

Outreach

Presentation made to the local Farm Bureau, board of directors at Soil and Water and the Resource & Conservation District (RC&D) on the use of windrow composting for dairy manure.
Anna Dawson made several presentations to local garden clubs about the importance of compost and the future availability from the farm.

Nutrient level information was not obtained from finished compost due to the exposure to rainfall.