



Land Application of Leaves and Grass Clippings

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Timothy J. Fritz, Associate Extension Agent
 Robert E. Graves, Professor of Agricultural Engineering

One of the simplest ways for communities to dispose of leaves and grass clippings is to apply them directly to crop land or use them for land reclamation purposes. Land applying these materials is sometimes referred to as leaf mulching. Composting leaves and grass is an alternative disposal method. Of the two choices, composting may be the best long-range solution, but land application or leaf mulching can provide an interim or permanent alternative that, in many cases, costs less. In the September 26, 1990 *Guidelines for Leaf Composting Facilities*, DER states: "In addition to leaf composting facilities, some municipalities provide leaves and grass clippings to farmers for use as soil nutrients or conditioners in normal farming operations, or use the leaves and grass clippings for land reclamation purposes."

Under most circumstances, contracting with local farmers to handle leaves and grass clippings can benefit both the community and the farmer. Tipping fees are necessary to ensure that the cooperating farmer(s) is being compensated for labor and equipment costs. If the farmers are not compensated adequately for their extra effort, the service they provide will probably end up being a low priority and, consequently, problems may arise. A contract that specifies what is expected of both parties is essential.

Benefits to farmers who accept leaves and grass clippings include:

- additional income
- nutritive material valuable for soil conditioning
- use of equipment that is already available.

Benefits to the community include:

- minimal start-up time and expense
- reasonable disposal costs
- eliminating the need for a composting site, equipment, and management

- less handling and hauling
- preserving local farms by providing farmers with extra income.

Two potential problems that farmers who handle leaves and grass clippings might face are:

- coordinating land availability and labor to deliver and spread material (Material must be spread within 7 days of delivery, so crop rotations might have to be altered to accommodate the timing of applications.)
- extraneous material mixed in with leaves and grass clippings.

Mutual Understanding

The community and farmer must recognize at the outset that each has different goals and constraints. Farmers must be prepared to take material as it is generated regardless of weather or field conditions. Storage areas, roads to storage areas, and modifications to crop planning may be necessary.

Municipalities should recognize the importance of providing leaves and grass that are free of trash. Truck drivers must respect the farmer's property, croplands, livestock, and family.

Environmental Benefits

Land application will keep leaves and grass clippings out of landfills and incinerators. The increased organic matter in the soil helps improve the condition of drought-prone or poorly drained soils. Odors, sometimes associated with composting, will not be a problem because spreading the material in a thin layer minimizes anaerobic odor.

DER Requirements

Any municipality or farmer considering land applying leaves or grass clippings should be familiar with the requirements set forth in *Guidelines for Leaf Composting Facilities*, which is available from DER regional or state offices. Some of the specific points that must be considered are:

- The farm should be located in the municipality where the material is collected unless special permission is granted from DER.
- DER must be notified of the intent to land apply leaves and grass clippings.

This notification should include:

- Sponsoring municipality
- Contact person
- Map showing location
- General site plan indicating access road(s), unloading area, surface water controls, farm conservation plan, and farm nutrient management plan.
- Operational narrative describing such things as: hours when material will be accepted, spreading and incorporation methods, spreading and incorporation frequency, plan for removing leaves and grass from bags.
- Leaves and grass clippings cannot be stockpiled or spread within 50 feet of property lines.
- Leaves and grass clippings cannot be stockpiled or spread on any wetlands.
- Leaves and grass clippings should be delivered to the farm in bulk. If they are in bags or containers, the bags or containers must be emptied on the day of delivery.
- Grass and leaves are to be spread 1) within 7 days of delivery to the farm, 2) according to the farm's nutrient management plan, and 3) no deeper than 6 inches.
- Grass and leaves should be incorporated into the soil no later than the following tilling season.

Contract Provisions

A contract between the municipality and the farmer(s) is necessary to ensure that both parties understand their responsibilities. Items that should be addressed include:

- tipping fee
- method for measuring material (cubic yards, truck loads, weight, moisture content)
- quality of acceptable material (amount and type of unacceptable materials, such as plastics,

glass, metals, large tree limbs, chemical contaminants, etc.)

- responsibility for removing and disposing of unacceptable materials
- responsibility for damage to fields, equipment, livestock, or water resources from unacceptable materials delivered in leaves or grass clippings
- acceptable container for delivery, i.e. in bulk or in paper or plastic bags
- responsibility for emptying and disposing of plastic or paper bags
- time periods and location(s) leaves will be accepted
- provisions for regularly reviewing the contract
- provisions for arbitrating disputes
- terms for changing the contract.

Education of Public and Workers

The community and workers gathering the leaves and grass clippings must recognize that farming is a business. A farm can only accept leaves and grass clippings if they do not have a negative effect on the operation of the farm. If handling leaves and grass is too disruptive to normal farming operations, the farmer will probably not wish to participate. Material must be free of bottles, cans, plastics, large tree limbs, and other debris. All parties should be aware that contaminants have the potential to cause costly equipment damage and injury or possible death to livestock. The best way to provide a clean, quality product for the farmer is to keep extraneous material out of the leaves and grass clippings. This requires that citizens who rake the materials to the curb and crews that load and unload the delivery trucks be considerate. Sweeping streets before leaves fall in autumn will also reduce the amount of contaminants.

Storage of Leaves and Grass

The first step in handling leaves and grass clippings on the farm is locating a suitable place for stockpiling the material. This spot should be convenient to the road to receive deliveries and convenient to the fields where the material will be spread. Because collecting these materials will continue regardless of weather, an all-weather road to the stockpiling area is important for trouble-free delivery. The size and type of vehicles delivering leaves should be considered when planning roads. DER regulations require that stockpiles be at least 50 feet from boundary lines. All surface water should be diverted away from the site. Runoff water

from the site should flow onto vegetated areas and not directly into a stream or drainage ditch. A concrete barnyard, manure storage pad, or bunker silo that is not in use makes an excellent stockpiling area. A location within view of the farmstead will make it easier to monitor the site and control unauthorized dumping.

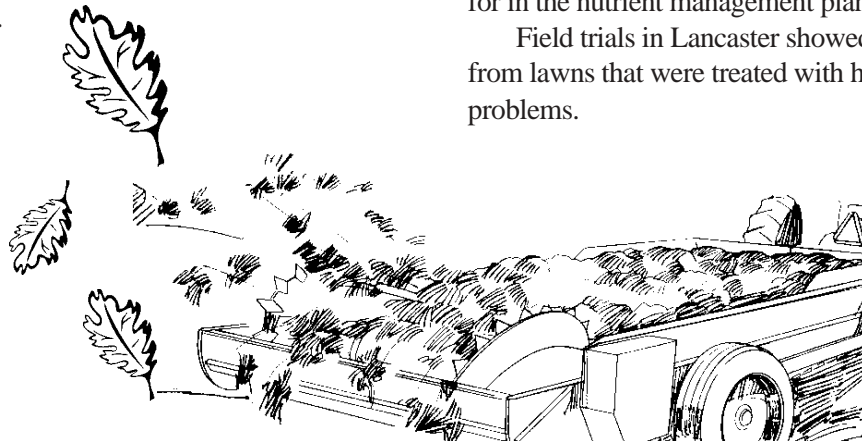
Application Methods and Equipment

Requirements for handling equipment on the farm are relatively simple. A conventional rear unloading beater-type manure spreader, a tractor to pull the spreader, and a tractor loader will be needed for loading and spreading the leaves or grass clippings.

Leaves will breakdown best if they are incorporated evenly within the top few inches of soil. Reports on the best equipment to use for incorporation vary. Incorporation will be affected by such things as soil type and vegetation, as well as the amount of material being spread, its moisture content, and how long it has laid on the ground. Most reports indicate that a mold board plow or offset disc do not work well to incorporate leaves. Farmers in New Jersey have reported good results with chisel plows (Kluchinski, New Jersey). Wisconsin studies have found that a rototiller worked well to break up and incorporate leaves (Peterson, Wisconsin). If possible, visit a farmer who is handling leaves or grass clippings. Be prepared to do some experimenting to see which tillage method works best. If additional tillage equipment or extra tillage steps are required, the economics of the operation will change considerably.

Nutrient Management Planning

A nutrient management plan is necessary for applying leaves and grass clippings. To avoid nutrient imbalances, the plan should balance the nutrients in the leaves or grass clippings against the nutrient needs of the crops. It is also recommended that field applications be rotated so that material is not applied to the same field year after year.



Limited data is available on the nutrient content of either leaves or grass clippings. A representative sample of the yard waste should be analyzed for its nutrient content. Manure analysis kits, available at your local extension office, can be used for this purpose. Generally leaves are higher in carbon than nitrogen. If leaves are applied immediately before planting a crop, they might cause a short-term nitrogen deficiency. It might be wise to plant a legume crop on land that has just received leaves. Leaves can be applied to a maximum depth of 6 inches according to DER guidelines. This will amount to about 800 cubic yards per acre. A more realistic amount to apply is 3 inches. It takes about 4 cubic yards of compacted leaves to make one ton.

Grass clippings are high in nitrogen and should be applied to land where a crop requiring high levels of nitrogen will be grown. The following analysis of fresh grass clippings is from a study done by the Lancaster County Solid Waste Authority.

Moisture content	16.7% (range 15.1% - 18.9%)
Density	8.3 pounds per cubic foot
Nitrogen	54.7 pounds / ton (range 47.5 - 60.8)
* approximately 30% of the nitrogen will be available the first year	
Phosphorus	18.7 pounds per ton (range 16.5 - 21.6)
Potassium	45.9 pounds per ton (range 31.1 - 57.1)
*Data is based on analyses of 3 different samples.	

Using the above averages, 10 tons of grass clippings applied per acre will provide about 164 pounds of available nitrogen, 187 pounds of phosphorus, and 460 pounds of potassium. This is similar to the nitrogen needs of a corn crop, but exceeds the phosphorus and potassium requirements. Also, the unavailable nitrogen will become available over time and must be accounted for in the nutrient management plan.

Field trials in Lancaster showed that grass clippings from lawns that were treated with herbicides pose no problems.

Summary

Leaves and grass clippings can be applied to crop land to provide additional organic matter and nutrients. Farmers can benefit from the nutritive value of the material and extra income. Municipalities gain a convenient, low-investment method for handling these waste products. Typical farm equipment can be used to apply and incorporate leaves and grass. Some experimentation may be necessary to determine the best application rates and incorporation methods. Both farmers and municipalities should be aware of the potential problems and be prepared to solve them and honor their sides of the agreement.

References and Additional Reading

“Agricultural Utilization of Yard Wastes.” *BioCycle* August 1991: 54-57.

Dean, L. and M. Wollenweber. “Curbside Collection of Grass Clippings.” *BioCycle* January 1989: 48-50.

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Kluchinski. Mercer County, New Jersey. Personal Communication. January 1992.

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Peterson, A. E., P. E. Speth, D. E. Schlough, T. H. Wright & T. B. Ginder. *Effect of Applying Leaves from Middletown, Wisconsin on Cropland*. 1989 Report.

DER Regional Offices

Harrisburg Regional Office
One Ararat Boulevard, Harrisburg, PA 17110
Telephone: 24 hours (717) 657-4585

Meadville Regional Office
1012 Water Street, Meadville, PA 16335
Telephone: 24 hours (814) 724-8550

Norristown Regional Office
1875 New Hope Street, Norristown, PA 19401
Telephone: 24 hours (215) 270-1900

Pittsburgh Regional Office
Highland Building, 121 South Highland Ave., Pittsburgh, PA 15206
Telephone: 24 hours (412) 645-7100

Wilkes Barre Regional Office
90 E. Union Street, 2nd floor, Wilkes Barre, PA 18701
Telephone: workday (717) 826-2553; after hours (717) 826-2511

Williamsport Regional Office
200 Pine Street, Williamsport, PA 17701
Telephone: workday (717) 327-3670; after hours (717) 327-3696

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For further information or for a copy of our Fact Sheet Listing contact:

Agricultural and Biological Engineering Department
246 Agricultural Engineering Building
University Park, PA 16802
Telephone: 814-865-7685
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