A Horse Keeper's Guide to Manure Management
1. Proper Manure Management is an important concern for every horse keeper.
2. Appropriate storage, handling, and recycling or proper disposal of manure helps protect water quality and keeps both horses and people healthy and happy.
3. Good manure management is essential for horses to be accepted as friendly residential neighbors in increasingly crowded suburban settings.
4. The overall result is water quality protection.
A 1,000 lb. Horse Can Generate:

- 8-10 tons of Manure a Year
  
or
- 30-lbs feces plus 20-lbs of urine = 0.75 cubic feet per day
  
or
- 12-15 cubic yards of manure annually

Bedding...

At an average 0.75 cubic feet per day, bedding can add an additional 10 cubic yards of waste materials annually to the manure.

Due to the volume of manure-waste generated from horses there is a pollution potential.
Here is a happy horse. Notice the clean paddock.
Average nitrogen, phosphorus, and potassium content (NPK) of horse manure and manure with bedding (dry weight basis)

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Manure</th>
<th>W/ Bedding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nitrogen (N)</td>
<td>0.95</td>
<td>19.0</td>
</tr>
<tr>
<td>Phosphorus (P)</td>
<td>0.30</td>
<td>6.0</td>
</tr>
<tr>
<td>Potassium (K)</td>
<td>1.50</td>
<td>30</td>
</tr>
</tbody>
</table>

1. This table shows the average nutrient content of horse manure alone and with bedding.
2. Equestrians implementing good land and manure management practices can eliminate water quality concerns.
3. In fact, manure that is properly handled can be recycled into a valuable soil amendment for farms and gardens.
4. A horse then might be said to have an environmental value!
Guidelines for Handling Manure

- Regular removal of manure
- Keep stalls and paddocks clean and dry
- Leave behind usable bedding

1. Regular removal of manure
   - is a good practice in confined areas
   - decomposition of manure starts as soon as it’s voided and nitrogen may be easily lost

2. Keep stalls and paddocks clean and dry
   - decomposition of manure depends upon handling and storage
   - nutrients in urine are readily absorbed in bedding

3. Leave behind usable bedding
   - separation of manure and shavings reduces volume of waste generated
   - alternative bedding, like pellets can reduce waste volume and speed recycling time if manure is composted
This paddock is in need of cleaning.
This paddock is not........(in need of cleaning).
Average amount of storage required for manure *

<table>
<thead>
<tr>
<th>No. of Horses</th>
<th>Manure</th>
<th>Manure w/Bedding</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>250 days</td>
<td>250 days</td>
</tr>
<tr>
<td>1</td>
<td>7</td>
<td>12-14</td>
</tr>
<tr>
<td>5</td>
<td>35</td>
<td>60-70</td>
</tr>
<tr>
<td>15</td>
<td>105</td>
<td>180-210</td>
</tr>
<tr>
<td>25</td>
<td>175</td>
<td>300-350</td>
</tr>
<tr>
<td>40</td>
<td>280</td>
<td>480-560</td>
</tr>
</tbody>
</table>

*cubic yards

1. Assumes 0.75 cu. ft. manure/day and 0.50 to 0.75 cu. ft. bedding/day. A cubic yard is 27 cu. ft. and occupies a cube 3ft x 3ft x 3ft.

1. Storage of manure removed from stalls and paddocks should have an adequate area for the amount of manure generated.

2. This table gives the average amount of manure storage space, in cubic yards, required, based on the number of horses and a range of bedding additions.

3. For example, a 144 square foot confined storage space (12X12 feet at the base) will hold manure from one horse for a year, depending on type and amount of bedding. Accumulation might be 3 to 5 feet in depth (high).
1. Large storage areas should be well constructed and accessible for use of power equipment. They should be large enough to house manure and bedding without any overflow outside of the containment area.

2. The storage area walls should be high enough to prevent manure from spilling over the top. The bottom should be gently sloped backwards.

3. Loading and unloading should be convenient.
   - the entrance should be constructed to catch and divert any runoff to a diversion ditch or grassed swale.
   - the surrounding area should be graded to keep surface water from running over or through the manure.

4. If the manure cannot be removed frequently, then screen or cover the pile with a plastic tarp.

5. Keep roof and yard water from draining into your manure storage area so that clean water stays clean.
1. Pasture Management differs from paddock and stall management. Pasture can supply a source of feed for horses, but vary in productivity.

2. Pasture productivity is related to:
   - the number of animals per unit area
   - vegetative makeup of the sod, and
   - the natural fertility of the soil

3. One to two acres of well-managed pasture can support one mature horse during the grazing season with rotation. When the animal is rotated as frequently as every two-weeks, the acreage needed could be closer to one acre. Four to five acres of unimproved native grass pasture will support only one mature horse for the entire grazing season.
1. Horses can do a fairly good job of distributing manure, but concentrated droppings from horses can suffocate or stunt plants underneath them.

2. To maximize pasture production, drag or harrow the pasture to break up the droppings and more evenly spread the manure.

3. To avoid concentration of manure in one or more isolated areas, the horse keeper should encourage even grazing.

4. If horses in the pasture receive supplemental feed, try moving the feeding location around.

5. Keep horses out of streams, ponds and wetlands. Use troughs or a automatic system to water horses.
Land Application

- Is an acceptable disposal method
- Requires knowledge of soils and application rates
  - fresh manure: clay and loam soils
  - composted manure: sandy soils

1. Land Application is one method of recycling manure as a soil conditioner to grow useful pasture grasses or other crops.
2. Proper application methods require knowledge of soils and application rates suitable to particular crops.
   - your local Farm Advisor or RCD can assist in determining your soils and rate of application.
3. Incorporation of manure into soil immediately following spreading will reduce losses of valuable nutrients, especially nitrogen.
4. Manure spread or piled and left exposed on sloping surfaces is subject to erosion, possibly contributing to nearby water contamination.
Example of land application. This picture shows about 2 inches of composted manure incorporated into soil.

1. Fresh manure is best used for crops with long growing seasons, and better suited to clay and loam soils, while aged or composted manure can be used on sandy soils.
2. Crops grown and harvested annually on one acre of land can easily utilize the nutrients available in the yearly accumulation of manure from a single horse.
Land Application Guidelines

Average manure application and land base area requirements for pasture crops.*

<table>
<thead>
<tr>
<th>Forage Crop</th>
<th>Annual Manure Application</th>
<th>Land Area Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red Clover</td>
<td>10</td>
<td>0.8</td>
</tr>
<tr>
<td>Ryegrass</td>
<td>11</td>
<td>0.8</td>
</tr>
<tr>
<td>Tall Fescue</td>
<td>13</td>
<td>0.6</td>
</tr>
<tr>
<td>Wheat Grass</td>
<td>2</td>
<td>3.8</td>
</tr>
</tbody>
</table>

*Adapted from Davis and Swinker, 1996 (assumes 8 tons manure/yr).

1. If stored manure is to be spread onto a field that grows crops, then manure nutrient content should match nutrient needs of the specific crop.
   - this increases potential for effective nutrient absorption by plants, which reduces potential for leaching or runoff risk.
   - manure can be sampled, packaged, and sent to a testing laboratory for nutrient analysis.

2. Manure application rates for selected forage crops are shown. Not all of the nutrients in manure are available for plant use.

3. For example, the percentage of the total nitrogen available is a function of the method of manure application and management as well as the age and chemical composition of the manure. Nitrogen content ranges from 35% of the total nitrogen if the manure is spread and left on the soil surface, to 60% if the manure is spread and worked into the soil within a day. Phosphorus is 60% and potassium 90% of totals.
1. This slide shows a manure pile that is mostly bedding material.
2. Large amounts of bedding in manure will have a high carbon and low nitrogen content. This can tie up usable nitrogen.
3. A supplemental source of nitrogen may be needed to offset any nutrient imbalance.
4. Avoid applying manure during the wet season.
Off-Site Disposal

- Manure bedding is a potentially valuable resource for:
  - Gardeners
  - Landscapers
  - Small Farms

1. Your manure and bedding is a potentially valuable resource.
2. Don’t allow your valuable resource to end up in a landfill!
3. Disposing manure in a landfill is quite costly due to trucking, tipping and landfill-use fees.
4. Gardeners, landscapers, and small farms in your area may be seeking organic amendments.
5. An alternative is to work with other horse keepers and organizations to develop a community or regional composting facility.
1. Composting is an excellent way of disposing and recycling manure.

2. It is the natural microbial breakdown of organic materials into smaller particles forming new organic molecules.

3. Composting manure may do the following:
   a. Decrease waste volume up to 50%
   b. Make handling waste easier
   c. Create demand for a product that could otherwise be a liability.

4. Composting is a managed process. Merely piling manure for some undetermined time is not composting!
Good Composting can Reduce the Risk of Manure To Water Quality by:

- *Reduction and elimination* of microbial pathogens
- *Reduction* of ammonia N-levels
- *Reduction* in water-soluble phosphorus
- *Reduction of* water-soluble organic matter (BOD)
- *Reduction in* total soluble salts
This is a diagram of the aerobic decomposition process.

1. Generally, raw manure, bedding and water are put into the system.
2. Oxygen is inserted actively or passively.
3. The system gives off heat, CO$_2$, water during the composting process.
4. A final soil amendment product comes out of the system.
Aerobic Compost Processes and Requirements

- Carbon and Nitrogen
- Air
- Water
- Temperature
1. Carbon (C) is the major component of organic matter (45 to 55%) in manure and bedding.
2. Nitrogen (N) is a plant macronutrient.
3. The carbon to nitrogen ratio is the amount of carbon compared to the amount of nitrogen in a substance.
4. A narrow ratio (equating to higher quantities of nitrogen) is optimal because more nitrogen may be made available as a fertilizer.
5. Horse manure alone will have optimum proportions of carbon and nitrogen that composting requires.
6. With the addition of bedding, particularly that derived from wood, C:N ratios will be higher as the bedding contains much higher amounts of carbon.
7. One note; manure, hay, and bedding must be relatively fresh for optimal composting so that the microbe-available carbon and nitrogen is high.
1. There are several ways to aerate your compost pile. This is the active Aerated Static Pile method. This design method blows air into the compost pile(s) from below.

**If more detail is desired by the audience, talk about this:**

a) A blower connected to a manifold has four lateral perforated pipes approximately 45 feet in length. The blower forces air through the manure pile to expedite aerobic decomposition of the manure, control odors, and destroy pathogens, weed seeds and fly larvae.

b) The pipe system sits on the gravel pad with the manure piled on top of it.

c) 30 days of waste (about 200 cubic yards) approximately measures 50-feet in length by 20-feet wide by 6-feet high.

d) At least 30 days of aeration/composting is required for adequate decomposition.

e) The completed manure pile is moved to a third location to cure.

f) New piles of fresh manure then are constructed over the aeration pipes.

f) A layer of the curing compost material (approximately 1-foot deep) is placed on the fresh composting pile to help temperature retention and odor control.

h) The process is repeated for each pile.

i) During the rainy season a waterproof barrier should be placed over the manure piles to prevent rain from mixing with the pile. This keeps any compost leachate from reaching any adjacent water bodies.
1. A semi-active aeration technique is to construct windrows and regularly turn them.

2. The row piles should not exceed 7 to 8-ft high.

3. Composting windrows are turned most efficiently with a front-end loader and should be turned every day, but 1 to 2 times a week may suffice.

4. Turing is necessary for aeration/aerobic decomposition.

5. Properly maintained windrows, to include turning, watering, and temperature taking, should compost for at least 30-days. Ideally, a 90-day composting duration should be attempted.

6. Completed piles may be moved to a curing pile to make room for new windrows.

7. Curing/finish compost can be drawn from the curing pile for use as a soil amendment.
1. Establish a regular turning frequency. Ideally, compost should be turned every day.

2. This may or may not be feasible. At a minimum, turning should be done 2 to 3 times a month. Be prepared to adjust the turning schedule based on time allotment and cost. Whatever turning frequency you decide on, remember that consistency is most important.

3. Recognize that there may be times (e.g. following heavy rainfall) when you may need to aerate, regardless of your schedule. Turning of compost should be done in a manner that allows as much air to be introduced to the material as possible while releasing trapped carbon dioxide.

4. When turning, allow material to fall from your shovel or bucket to expose as much surface area as possible to the open air.

5. Drop material from a loader into the bin or windrow from the maximum bucket height.

6. With a hand-shovel, give it a good toss.

7. Excessive aeration can lead to large losses of nitrogen as ammonia, gas and lower product quality.
1. Moisture content of the manure and bedding might be adequate in the fresh state, so additional moisture might not be unnecessary until the compost is moved or turned. However, it may be necessary to add water to the material prior to loading it into a bin or building a pile or windrow.

2. During the dry season, particularly mid to late summer, have an ample water supply and pressure to “irrigate” the compost as it is turned or moved to another bin.

3. Ideal moisture content is approximately 50%.

4. Moisture content can drop as low as 25 percent within 4 weeks of active thermophilic decomposition. To reestablish about 50% moisture, add about 20 to 30 gallons of water per 100 cubic feet of compost.

   4a. For example, in a 4-bin system (1,000 cubic feet each) 1,200 gallons of water may be needed at every turning. The actual amount of water needed will vary substantially depending on the kind of bedding used, the size of particles in the bedding and other site specific factors. Some operations pre-water the manure in the storage area prior to composting. A portable pump, hose and spray nozzle is an effective means to water compost if a source of water is close by.

5. If the compost gets too wet, observe the temperatures and turn the compost if temperatures do not rise in a couple of days. This will help drive off some moisture.

6. **Important note!** Permits are required for taking water from natural creeks and ponds. A Riparian Right, an Appropriate Water Right, or a Small Domestic Registration is required from the State Water Resources Control Board, Division of Water Rights. Contact them directly at (916) 341-5300 for more information.
1. Checking compost temperature is the easiest way to keep track of a composting system.
   a) Fresh materials will heat-up significantly within 24 hours and may reach 155°F in 2-3 days.
2. A long-stemmed thermometer and record-keeping are all that is needed for taking compost temperature.
   a) Two feet down from the top of your pile, carefully insert the thermometer stem halfway into the pile for 2 to 3 minutes (allowing the needle or digital display to stabilize).
d) Record the date, time, bin or pile number, location within the bin (e.g., center, northwest corner, etc.) and temperature.

e) Take multiple readings per bin or pile and average them. For bins, take 4 to 5 readings. For long windrows, take a reading about every 15 to 20-ft.

f) Measure temperatures at least daily for the first week after the compost pile or windrow construction. Then weekly thereafter as long as the temperature ranges between 130 to 160°F (thermophilic range).
1. Declining temperatures early in the composting period likely indicate declining oxygen levels or less than optimal moisture content.
   a) temperatures immediately after turning and wetting will obviously be near air temperature, but should rebound within 48 hours.

2. The thermophillic stage of decomposition may last for 2 to 6 weeks depending on the starting C:N ratio.
   a) manure containing lots of shavings tend to maintain thermophillic temperatures longer than manure alone or with low volumes of bedding.

3. Keep temperature measurements documented in a file for proof to prospective buyers that weed seeds and pathogens have been deactivated or killed.

4. Piles must be built to an appropriate size that retains (insulates) heat, but not too large. In larger piles, temperatures rise so high spontaneous combustion may occur. Three things contribute to temperatures spikes that induce spontaneous combustion.
   a. Piles or windrows are too large (overly insulated)
   b. Piles or windrows are aerated infrequently
   c. When moisture levels decline below 35%.
The advantages of the Aerobic Thermophillic Composting Method are many:

- Pathogens exposed to thermophillic temperatures for periods of from 24 hours to weeks at a time are destroyed
- Decomposition is rapid, volume reduction occurs quickly
- Less time and space are required in comparison to slower methods
Is That Compost Done?

- Temperature is a key indicator
- Finished when there is a 15 to 20°F difference between internal pile and ambient mid-day air temperature

1. Temperature is a key indicator of progress towards finished compost.
2. Compost is finished when there is only a 15 to 20 degree difference between internal pile temperature and the air temperature in the middle of the day.
3. Aerobic composting has three distinct phases:
   * active, high decomposition phase (thermophillic, 2 to 6 weeks);
   * a slower decomposition phase, (mesophillic, 3 to12 weeks) carried out by different microbes
   * a curing or finishing stage (4 to 8 weeks) where subtle changes in the biological and chemistry of the compost occur.
4. This last phase creates “mature” compost. Mature compost is that granular, dark brown, earth-smelling material that we associate with potting soil.
5. Obtaining a lab test of your compost is recommended if you plan on selling your finished product.
Site Selection and Construction
1. This slide shows a compost site prior to preparation.

2. Number of horses, labor and equipment available, space available, and management cost and time will determine whether composting is appropriate for you. You should consider:

3. **Size** – There must be adequate space available to:
   a) handle the anticipated volume of manure and bedding
   b) provide equipment access and working area.
   c) accommodate active composting and temporary storage of final product

4. **Permit Requirements**
   a) check with your local planning department to confirm permit requirements. You may have to submit a compost operations plan and keep minimal records.
   b) a larger stable may already have an operating permit that allows for composting as a manure management alternative.
### Basic Components of an On-Farm Composting System

- Staging area away from creeks and drainage;
- Bins or piles large enough to maintain temperatures;
- A mechanism for turning and aerating the bins or piles;
- Temperature taking
- Available water irrigation system

There are several ways to design an on-farm composting system, and no single one is appropriate for all sizes and types of facilities.
1. The site must be sized appropriately
2. Operating surface should allow all-year access and minimize the risk of leaching into groundwater
3. The site or pad should be on flat ground or a very gentle slope and allow for uniform drainage.
4. Runoff from the site should be contained or conveyed to a settling pond or vegetated filter strip.
5. The site should be a minimum of 100 feet from surface water bodies or at least 50 feet downhill from a water body. The basic idea is to keep the manure away from the creek.
6. The site should also not create “viewshed” issues for neighbors and should be located to minimize complaints about odor & dust.
1. Bare soil is not acceptable unless it is a fine clay that can be well compacted and does not receive heavy rainfall for long periods of the winter.

2. A low permeability crushed rock or rock dust surface, concrete or asphalt pads may be required.
1. This road has had road rock rolled into its bed to allow year round access to the compost site from the stable by a front end loader.

2. After a few trips the rock will “disappear” under the dirt but will easily be able to hold the weight of manure and equipment during winter months.

3. If the compost site is located a distance from the stable area, then access to the site may require improvements.
Compost Site Construction Specifics
Controlling runoff and drainage from the compost site is very important.

Here, a detention system is being constructed around a 6,000 square foot compost pad that could accommodate 600-700 cubic yards (16,200 18,900 cubic ft.) of compost annually.
1. Grassed swales have been built around the compost site to keep runoff from the creek and treat it prior to entering the storm water retention pond.

2. The attention garnered by this project and outreach efforts by the RCD have resulted in interest from other stables, horse keepers, farmers and the county.

3. The county is investigating the feasibility of a regional composting facility where equipment and transportation of manure might be spread across a number of facilities.

4. A demonstration of such a cooperative facility is being proposed.
A detention basin should be included in the design at the low end of the compost pad to capture and temporarily hold storm water.

This picture shows an energy dissipater coming out of a detention basin.
Note how the outlet pipe dissipates energy by discharge water flowing over rocks prior to entering a vegetated buffer.
This detention basin controlled a heavy November 2002 storm event
Notice how the detention system protects runoff from leaving windrows. An improvement would have been to line the inside edge of the ditch with ecology blocks allowing easier operation of heavy equipment moving compost.
Managing the Compost Process

Initially, manure is moved from the stall or paddock to a manure storage site.
1. For small operations, constructed compost bins may be the appropriate approach.

2. A series of bins is an effective method and can be scaled-upwards for operations with less than five horses.

3. Size of the pile does matter. Bins 4’ X 4’ X 5’ tall, constructed from 2” X 6” (untreated) boards and heavy-duty posts can be adequate. Bin design and dimensions will vary with amount of manure generated. Some have used pallets as a material to construct bins.

4. Wooden floor bins with small spaces between boards allow air to move underneath the pile better than bins built directly on the ground. Flat-drain tile on the wooden floor will further enhance airflow.

5. Each of these bins should easily hold 1.5-ton of horse manure. When aeration is desired, the material is moved from one bin to another.

6. If more than six bins of this size fill up, you may want to consider a windrow composting system.
1. For larger operations, a windrow approach will be the most appropriate system.
2. These windrows or piles should be no more than 7 to 8 feet high and may be of any feasible length.
1. Windrows and large piles require equipment capable of moving larger quantities of materials.

2. Many stable operations will already have a front-end loader and this is quite appropriate for any size facility.

3. Dedicated compost turner staff are only appropriate when the quantity of manure is quite large (perhaps > 100 yards per week) and the cost can be reasonably recouped through compost sales or lower disposal costs.
1. This site is adjacent to a stormwater holding pond, about 100 feet from a creek, and barns 100-300 feet from the compost site.

2. The site was graded so all runoff would drain toward the holding pond across a grass filter strip.

3. A berm along the creek side of the site was established to prevent runoff into the creek.

4. The composting pad was surfaced with gravel to permit wet season use.

5. Gutters were added to roofs so that the clean roof runoff was channeled to the pond as required by local regulations and kept from the compost pile.
1. At this site, composting began in 1999 and experienced problems due to inadequate equipment to handle the waste and a high percent of bedding materials.

2. Purchase of a larger piece of equipment was not feasible for the stable.

3. The finished product is less than desirable due to the high carbon content (undecomposed shavings).

4. The compost is periodically trucked off site to a local farm.

5. Overall the operator is pleased with the compost system. The reduction in volume means they can hold material longer and trucking for disposal has been reduced from 12 to 2 times a year.

6. More finished product is also used on site. The costs of the operation are a concern mostly from having added a “new” business to the stable, along with labor and equipment.
A five acre horse boarding facility, surrounded by a housing tract, has developed a “modular” manure management and composting system using compost bins. As the number of horses increases to a maximum of ten, the number of bins will increase to meet the need. The bins are located at different sites at the ranch for convenience. The mobile bins can be moved with a forklift around or off the ranch.

1. The bins are 4’ x 4’ x 4’.
2. Daily stall cleanouts are placed into a bin on top of six inches of dry wood shavings placed in the bottom of the bin to absorb any liquid from the manure.
3. 3-4, five-foot lengths of 4” diameter PVC pipe drilled with holes are placed vertically within the bins to improve aeration.
4. When the bin is filled so that manure is piled one-foot above the rim, a water resistant, breathable tarp is used to cover the bins to help the composter control the moisture content of the manure.
5. Once the manure has reached the optimal point of dampness, the tarp can be deployed to cover the manure and the outside of the bin sides.
6. The PVC pipes are exposed above the manure and will ventilate through the tarp.
7. Temperatures are monitored weekly.
8. Compost produced from the facility will be used on-site for a proposed native nursery or given away to neighbors in the vicinity.
1. This site boards 60-70 horses in a narrow canyon along a creek.
2. Manure is stored in two three-sided cement bunkers located adjacent to stalls.
3. The bunkers do not allow runoff to leave and are located away from the creek.
4. The manure is watered daily to ensure starting moisture and moved to the compost site every 2-3 days.
1. The compost site improved an existing concrete pad through grading and addition of rock to a size of 6,000 sq. ft.

2. Detention ditches, constructed of gravel and erosion control fabric, surround the pad and drain into a retention basin and have performed well.

3. The site is above the flood plain of the creek and away from the stables.

4. An irrigation reservoir is located adjacent to the site and a 4 HP 2 inch pump used to water the compost when needed.
The operator has required all boarders to switch to a pelleted bedding material and estimates that this will further reduce volumes by 20-25%, require less time to compost and result in a better product with a lower C:N ratio.

Lab analysis have been favorable. More importantly measurements of E. Coli in the stream running through the stable have dropped from 504 in March, 2002, to 31 in March, 2003, and the farmer believes that the compost will help him create new prime soils over time.

The operator believes his manure disposal costs will decrease by 25-35% over time through both the use of pellets and by composting.
Six months of manure is about 300 cubic yards reduced to 150 cubic yards of compost.

It will cover one half acre of soil with about 2 inches of compost.

1. The operator has figured that six months of manure is about 300 cubic yards reduced to 150 cubic yards of compost which will cover one half acre of soil with about 2 inches of compost. Here cured compost is being loaded into a dump truck.

2. The finished compost has been worked into an agricultural field with marginal soils that will be planted after a year of adding compost and working it into the soil.
Composting Economics

- Assessing the economics of composting is a good pre-project task.
- There is no standard guide, however, some requirements are fairly obvious. - How much manure will your horses produce annually? (number of horses \times 0.75 \text{ cu ft per day manure} \text{ plus another } 0.75 \text{ cu. ft per day of bedding} \times 30 \text{ days a month} \times 0.03704 = \text{ cu yards of waste a month}).
- Can you commit the time or afford the labor for a compost operation?
- Do you have the space?
- Do you have the necessary water readily available?
- What will it cost to build a compost facility to meet your needs?
- What equipment do you have or will you have to purchase?
- What will be the cost per ton for composting?
- What are you currently spending, per ton, to dispose of your manure?
- What will be the final use or method of disposal?
- Can you recover any costs (sell compost)?
Cost Summary for Compost Demonstration

40 horses, approximately 747 yards of manure and bedding annually; Assumes land for site, water source and front end loader already available; Present average annual cost to haul manure & bedding to landfill: $14,400.

- Total Capital (investment) Required: $7,014
- Total Annual Fixed Cost: $985
- Total Annual Variable Costs: $8,969
- Total Annual Costs: $9,995

1. Cost per cubic yard composted (747 cu yd): $13.33
2. Cost of trucking compost to neighboring farm: $390

- Estimated Average Annual Savings: $4,055

Total Capital (investment) Required = Site development, road grading, materials, watering system and detention system

Total Annual Variable Costs = Labor for site and management, fuel, maintenance of loader and pump, other expenses.

Total Annual Costs
  - Cost per cubic yard composted (747 cu yd): (Remember the initial 747 cu yd is reduced by 50%)
  - Cost of trucking compost to neighboring farm ($65 per hour for truck, front end loader used by composter)

- Economics for those with a couple of horses may not be a tough decision and may require little room and a strong back.
- For the larger horse keeper or stable, significant costs may be involved for site development, equipment and operating costs like labor, electricity and water.
  - Key considerations are that composting costs should make sense for the stable as opposed to what the stable is currently spending to dispose of manure.
  - An example based on an actual compost demonstration is presented. It assumes the compost site is readily available, heavy equipment is already owned, water available, and the compost is given away.
  - The decision to compost is often directly tied to the business plan of the specific stable or horse facility.
  - Composting may not make economic sense for all stables.
  - The final factor is potential markets for the finished compost to see if there may be a new revenue for the stable.
Here are a few rules to consider and “live by” before and after you become a composter:

1. If you manage a larger facility, be prepared to spend some time educating your clients about your goals for manure management with composting.

2. Prepare your site to ensure the compost area drains well. Ponded water, especially around manure and compost, will cause odor and fly problems. A small box blade will help keep the area smooth and well drained.

3. Collect manure from the corrals and pens carefully. Try to keep mineral soil out of the manure, and keep track of how many wheelbarrow loads are delivered to your system every day. Try to limit the amount of woody bedding materials that end up mixed with manure.

4. Try to ensure good drainage from any outdoor horse pens from which manure is collected. Muddy conditions give you soil-laden manure, reducing the organic matter content per unit of compost. Instruct employees to keep garbage, plastics, carcasses and animal-health products (syringes, vials etc.) out of the compost piles.

5. Make provisions for adding supplemental water when needed. Shaping the tops of the piles to capture irrigation or rainfall may be helpful.
6. Monitor compost temperatures every few days initially and at least weekly. Temperature alone will not tell the full story, but it can be an indicator of success or of imminent problems.

7. Keep the composting area clean and well maintained. If you have a boarding operation, a good image is vital to improving your client’s cooperation and for compost marketing success.

8. Use the finished product in your landscapes, planters, and gardens. If you use it and like it, your clients will be more inclined to try it, too.

9. Have laboratory analysis performed on compost samples from time to time. Knowing your product will reassure your compost market and will help you identify ways to improve your system. A routine analysis will include nitrogen, phosphorus, potassium, sulfur and total salinity. Organic matter analysis adds significantly to the cost, but it will help you determine if manure-harvesting methods are picking up too much mineral soil, which reduces compost quality.

10. Compost has a value, carefully consider what makes sense to you before you give the compost away. A nominal fee will stimulate interest and the revenue will offset costs.
Why Should You Compost????

BECAUSE IT’S ALL ABOUT RESOURCE CONSERVATION AND WATER QUALITY!
Credits

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