

ECONOMICS OF MANURE COMPOSTING

Fact Sheet

Equine Facilities Assistance Program

October, 2003

In order to assess the economic impact of composting as an alternative to other means of disposal or recycling of manure, it is critical to identify potential costs associated with the following categories:

- ✓ Capital costs for site improvements
- ✓ Capital and operating costs for irrigation/moisture management
- ✓ Equipment operation costs (including manure transport to composting pad)
- ✓ Labor costs at site and for administration

Preparing a budget to assess manure composting requires consideration of these and other factors. This Fact Sheet will review those factors and then provide hypothetical examples of cost estimates.

Cost tradeoffs are greatly affected by the volume of manure and bedding generated, the types of pre-existing equipment available, the operator's labor rate(s), and whether finished material must be land-applied, trucked or hauled away, given away, or sold as a bulk or bagged material.

Capital costs (purchase) for equipment, services, and materials may be amortized for up to a 20 year life, so these one-time costs are spread over a reasonable operational 'lifetime'. Labor costs should be determined by the operator or represent typical labor rates plus overhead (taxes, insurance, benefits) for the area. Administrative costs such as management time, phone, fax, and miscellaneous costs such as licencing/permitting, should also be estimated. Labor and management records should be kept during the project to verify costs and revise costs, especially if these costs decline during the first year of the project due to an increase in operations efficiency.

Site improvement costs include materials and labor for composting pad improvements, any necessary access (road improvement), the installation of runoff detention structures, and water irrigation costs. Irrigation requirements may be inexpensive if a water source is close and may include such items as a portable gas pump, fittings and a hose, or become very expensive if a water source must be developed. Annual irrigation costs for fuel or electricity associated with water pumping from a reservoir, well or other water source to the pad site should be estimated. A temperature probe is highly recommended.

The cost of moving the manure to the compost site and turning it must also be considered. Often it will depend on if the equipment is available or must be purchased. Once the equipment is identified and amortized, then costs will need to be calculated. These include all assumed costs related to equipment use for manure transport, windrow/pile construction, and monthly turning-aeration. Elements include fuel cost per hour, repair and maintenance, cubic yard of manure handled per hour, and total hours of equipment use.

Additional assumptions related to composting, including raw materials and the process itself, are needed in order to arrive at a final cost estimate per cubic yard of finished compost. It is also critical to understand the amount of volume reduction that occurs during composting and curing.

Assumptions include total input in cubic yards, output volume of compost as a percent of input,

compost output volume in cubic yards before curing, any additional loss during curing (by volume), and finished compost output in cubic yards.

A final consideration is the costs that may be avoided if the manure otherwise had to be disposed. Disposal might include trucking or hauling to a landfill or other disposal site. The costs the facility is currently paying for disposal including management and labor time need to be considered. Alternatively, if the finished compost is sold, then these revenues can be considered in the budget.

The following scenarios provided all reflect differing assumptions related to the above variables. They assume the location to be in San Mateo, Marin, Sonoma or Alameda County. These scenarios are intended to illustrate differences in operations. Each operator is advised to make their own estimates based on a budget that is specific to their facility.

Scenario A

A 20 to 25 horse boarding operation, with a small on-site loader, a 0.1 acre level site that requires additional leveling and minor surfacing, installation of runoff controls (e.g. vegetative filter strips and berms), and has water available from an on-site well. Site owner's labor is assumed at \$25.00/hr. It is assumed that 225 cubic yards of finished compost is generated annually and the compost is utilized on-site.

Total Capital Required	3,125
Total Annual Fixed Costs	150
Total Operating Costs	7,610
Total Annual Costs	7,760
Cost per cubic yard composted	\$34.48

Scenario B

A 5 horse 'ranchette' operation, with a small on-site loader, a 1,000 sq. ft level site that requires no grading or surfacing, installation of runoff controls, and has water available from on-site well. Site owner's labor is assumed at \$25.00/hr. It is assumed that 50 cubic yards of finished compost are generated annually from approximately 100 cubic yards of manure and bedding produced each year. The finished compost is used on-site.

Total Capital Required	1,125
Total Annual Fixed Costs	50
Total Operating Costs	4,301
Total Annual Costs	4,351
Cost per cubic yard composted	\$87.02

Scenario C

A 75 horse boarding operation, with a medium-sized on-site loader, a 0.25 acre level site that requires additional leveling and surfacing, installation of runoff controls (e.g. vegetative filter strips and berms), and has water available from an on-site well. Site owner's labor is assumed at \$40.00/hr and an additional laborer at \$12/hr. It is assumed that 800 cubic yards of finished compost are generated annually and compost is sold as a bulk product ('U load and U haul') at \$10/cu. yd.

Total Capital Required	3,125
Total Annual Fixed Costs	150
Total Operating Costs	12,429
Total Annual Costs	12,579
Gross Revenue from Sales (assume half is sold)	4,000

Cost per cubic yard composted \$10.72

Scenario D (greater detail)

This facility has 40 horses and produces approximately 747 cubic yards of manure and bedding annually. The scenario assumes land for a compost site, water source and front-end loader are already available. The present average annual cost to haul manure & bedding to the landfill is \$1,200 per month or \$14,400 annually.

Total Capital (investment) Required: Site development, road grading, materials, watering system and detention system	\$ 6,895
Total Annual Fixed Costs (7 year amortization):	\$ 985
Total Annual Variable Costs: Labor for site and management, fuel, maintenance of loader & pump, other expenses	\$ 8,970
Total Annual Costs:	\$ 9,955
Cost per cubic yard composted (747 cu yd):	\$ 13.33
Cost per finished cubic yard of compost:	\$ 26.65
Cost of trucking compost to neighboring farm: (\$65 per hour for truck, front end loader labor provided by compost operator)	\$ 390
Estimated average annual savings:	\$ 4,055

Economics for those with a couple of horses may not be a tough decision and may require a very small area and a strong back. The larger horse keeping facility's decision to compost or not is often directly tied to the business plan of the specific stable or horse facility. Composting may not make economic sense for all stables. Do your homework first!

Contact your local Resource Conservation District for further information on manure management and with help in estimating composting costs and returns.

Funding for this project has been provided to the Council of Bay Area RCD's in part by the U.S. Environmental Protection Agency (USEPA) pursuant to Assistance Agreement No. C9-989697-00-0 and any amendments thereto which has been awarded to the State Water Resources Control Board (SWRCB) for the implementation of California's Nonpoint Source Pollution program. The contents of this document do not necessarily reflect the views and policies of the USEPA or the SWRCB, nor does mention of trade names or commercial products constitute endorsement or recommendation for use.