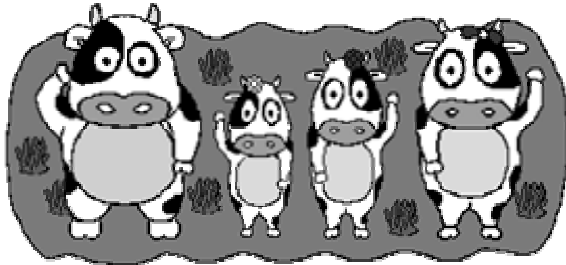


Hello There!



Organic Waste Handling “Systems”

ABE 5707
Agricultural Waste Management



Discussion Topics

1. Analyzing existing systems “components”
2. Alternative handling and treatment technologies
3. New systems?
4. Alternative uses for “wastes” (economics and energy)

“Components” of Organic Waste Handling Systems

Six Basic Components

A. Components

1. Production
2. Collection
3. Storage
4. Processing or Treatment
5. Transportation
6. Utilization or Disposal

B. All components may or may not be present in a system

C. Two components may be combined into one, i.e., one component may serve two functions

D. Specified combination of components represents a system by a given name -- examples:

1. Liquid manure handling system
2. Composting system -- MSW, yard waste, manure, etc.
3. Lagoon system

1. Production -- See Ch 4 Ag Waste Characteristics

(<http://www.info.usda.gov/CED/ftp/CED/neh651-ch4.pdf>)

- a. Characteristics
- b. Quantities
- c. Possibilities for changing
 - Water use
 - Separation or segregation of waste streams

2. Collection -- examples

- a. Manual -- shovel or broom
- b. Flushing
- c. Grates or underfloor drains
- d. Vacuum
- e. Mechanical sweepers or brooms
- f. Mechanical scrapers
- g. Waste basket or compactor trucks
(municipal solid waste)
- i. Sewer systems

3. Storage -- examples

- a. Lagoons
 - several types
 - biological treatment and storage
- b. Storage ponds -- designed on volume basis
- c. Tanks
 - various materials -- steel, concrete, fiberglass, etc.
 - above ground or below ground
- e. Stacking
- f. Sanitary landfill

4. Processing or Treatment -- examples

- a. Lagoons
 - (1) Anaerobic
 - (2) Aerobic
 - (3) Aerated (mechanically)
 - (4) Other -- facultative, polishing ponds, oxidation ponds

4. Processing or Treatment (cont'd)

- b. Aeration
 - (1) Odor control
 - (2) Decomposition
 - (3) Nutrient removal
- c. Solids separation
 - (1) Pretreatment
 - (2) By-product development
- d. Chemical
 - (1) Chlorination
 - (2) Acid or alkali
 - (3) P removal (nutrients)

4. Processing or Treatment (cont'd)

- e. Drying or dehydration -- energy intensive and expensive
- f. Anaerobic digestion
 - (1) Methane production
 - (2) Solids destruction and stabilization
 - (3) Odor reduction
- g. Heat treatment -- rendering of mortality and processing wastes
- h. Composting

4. Processing or Treatment (cont'd)

- i. Mechanical size reduction
 - (1) Shredding
 - (2) Grinding
 - (3) Chipping
- j. Compaction
 - (1) Woodex
 - (2) Fireplace logs
 - (3) RDF - refuse derived fuel
- k. Incineration

5. Transportation – examples

- a. Conventional or “dry” truck or box spreader
- b. Tank truck or wagon
- c. Pump and pipe
- d. Barge
- e. Pipeline
- f. Conveyors or augers
- g. Railroad

6. Utilization or Disposal – examples

- a. Land application
 - (1) Fertilizer
 - (2) High rate
 - (3) Soil Amendment
 - (4) Compost
 - (5) Peat substitute
- b. Methane
- c. Worm production -- vermiculture
- d. Algae production

6. Utilization or Disposal (cont'd)

- e. Mushroom production
- e. Feed
 - (1) Processing wastes
 - (2) Livestock wastes (composted or ensiled)
 - (3) Products from rendering plants
- f. Energy
 - (1) Combustion
 - (2) Thermal gasification
 - (3) Methane
 - (4) Alcohols

Components

- Production
- Collection
- Storage
- Processing or Treatment
- Transportation
- Utilization or Disposal

Why choose a particular waste management system?

- (1) Adapted to cultural production practices
- (2) Cost
- (3) Success at other locations
- (4) Land availability and cropping system
- (5) Odor control
- (6) Soil type and geology
- (7) Climate and rainfall
- (8) Need to export nutrients
- (9) Opportunity to market by-products or energy
- (10) Other