

WASTE MANAGEMENT

GENERAL

Soil interpretations for waste management provide a means to use organic wastes and waste-water as productive resources. Soil limitation ratings are given for land application of manure and food processing waste, land application of municipal sewage sludge, disposal of waste-water by irrigation, treatment of wastewater by the slow rate process, treatment of waste-water by the overland flow process, treatment of wastewater by the rapid infiltration process, and carbonaceous materials used as a soil conditioner and stabilizer.

LAND APPLICATION OF MANURE AND FOOD PROCESSING WASTE

Manure is the excrement of livestock and poultry. Food processing wastes consist of damaged fruit and vegetables and the peelings, stems, leaves, pits, and soil particles removed in food preparation. High nitrogen content limits application. The soil properties and qualities considered are those that affect soil absorption, plant growth, microbial activity, the susceptibility to wind or water erosion, and the rate and method of the application of wastes.

LAND APPLICATION OF MUNICIPAL SEWAGE SLUDGE

Municipal sewage sludge is the residual product of the treatment of municipal sewage. The solid component is composed mainly of cell mass, primarily bacteria cells which have developed during secondary treatment and which

have incorporated soluble organics into their own bodies. Sludge also contains small amounts of sand, silt, and other solid debris. Municipal sewage sludge has variable nitrogen content. Some sludge contains constituents that are toxic to plant growth or hazardous to the food chain (such as heavy metals or exotic organic compounds) and should be chemically analyzed prior to use. The soil properties and qualities considered in rating the degree of limitation are those that affect soil absorption, plant growth, microbial activity, the susceptibility to wind or water erosion, and rate and method of application.

DISPOSAL OF WASTEWATER BY IRRIGATION

In this guide, wastewater is municipal wastewater and wastewater from food processing plants, lagoons, and storage ponds. Municipal wastewater is the water in the waste stream from a municipality. It contains domestic waste and, in some areas, includes industrial waste. Food processing wastewater is the wastewater resulting from the preparation of fruits, vegetables, milk, cheese, and meats for public consumption. The soil properties and qualities considered in rating the degree of limitation are those that affect the design, construction, management, and performance of wastewater irrigation systems.

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TREATMENT OF WASTEWATER BY THE SLOW RATE PROCESS

In this process, wastewater is applied to the land at a rate normally between 0.5 and 4.0 inches per week. The primary purpose is wastewater treatment rather than irrigation of crops. The applied wastewater is treated as it moves through the soil. The soil properties and qualities considered in rating the degree of limitation are those that affect soil absorption, plant growth, microbial activity, the susceptibility to wind or water erosion, and the application of wastes.

TREATMENT OF WASTEWATER BY THE OVERLAND FLOW PROCESS

In this process, wastewater is applied to the upper reaches of sloped land and allowed to flow across vegetated surfaces which are sometimes called terraces, to runoff collection ditches. The length of the run generally is 150 to 300 feet. Application rates range from 2.5 to 16.0 inches per week. The soil properties and qualities considered in rating the degree of limitation are those that affect absorption, plant growth, microbial activity, and the design and construction of the site.

TREATMENT OF WASTEWATER BY THE RAPID INFILTRATION PROCESS

In this process, the wastewater is applied in a level basin and percolates through the soil. The treated water eventually reaches the ground water. Application rates range from 4 to 120 inches per

week. The soil properties and qualities that influence risk of pollution, design and construction, and performance are the major considerations.

CARBONACEOUS MATERIALS USED AS A SOIL CONDITIONER AND STABILIZER

These materials include wood processing wastes, leaves, straw, stover, some paper products, manure, and municipal sewage sludge. These wastes are solid, and some can be spread by using blowers. Soils vary widely in the extent to which their tilth can be improved by the addition of organic materials. In general, more benefits are gained by applying organic materials to: (1) soils that are low in organic matter, (2) sandy soils, in order to improve the available water capacity and reduce soil erosion, (3) clayey soils, in order to improve tilth, reduce clodiness, and reduce the energy required in tillage, and (4) silty and sandy soils that have a very low content of clay, in order to reduce soil compaction.

REFERENCES

- (1) Soil Survey Manual
<http://soils.usda.gov/technical/manual/contents/chapter6c.html#28>
- (2) Soil Data Mart.
<http://soildatamart.nrcs.usda.gov/Survey.aspx?State=WV>
- (3) Web Soil Survey.
<http://websoilsurvey.nrcs.usda.gov/app/>