Soil Quality Information Sheet

Soil Quality Resource Concerns: Sediment Deposition on Cropland

USDA Natural Resources Conservation Service **April 1996**

What is sediment deposition?

Sediment is solid material that is or has been transported from its site of origin by air, water, gravity, or ice to a field or low landscape position. Deposition occurs when the amount of sediment becomes greater than the carrying capacity of the force that is moving it.

How is soil quality affected?

Sediment can either improve or degrade the soils upon which it is deposited. The impact of sediment deposition depends on the characteristics of the original soil, rate of deposition, type of material, and depth of deposition.

Fine-grained soil particles deposited on sandy soils generally improve soil quality, but if coarser material is deposited on fine-textured soils there is a more delicate balance. Soil quality may improve over a short period, but coarser material generally results in degraded soil structure and physical characteristics and decreased fertility.

Deposits of infertile sand on a highly productive silt loam that is high in organic matter and nutrients can significantly decrease the quality of the silt loam. However, soil quality would change little if similar deposits occurred on a sandy soil that had a low content of organic matter, and low levels of nitrogen, phosphorus, and potash.

The rate of deposition also affects soil quality. If an inch of sand is deposited on a fertile soil every year for 16 years, the effects would be much less than if eight inches of sand were deposited in one year. Incremental deposits become incorporated with the surface layer and improve with organic matter accumulation.

How is sediment deposition identified?

Modern deposits of sediment have different physical characteristics than the older, buried soils upon which they were deposited. The buried soil is generally darker and more uniform in color. The sediment deposits are generally less dense, with a wider range in grain sizes. Sediment deposits often show distinct stratification or layering.

What can be done about sediment deposition?

Management response to sediment deposition is generally determined by the depth of deposition and the quality of the underlying soil. Generally, as the depth of sediment deposition increases, less mixing is possible.

Potential management practices include the one-time use of**:**

- **moldboard plowing,** which generally turns 6 to 8 inches of soil over but causes a minimum amount of mixing between the surface and subsurface layers.

- **chisel plowing,** which causes a greater degree of mixing but generally disturbs the soil to a shallower depth of only 4 to 6 inches.

- **deep chiseling,** which disturbs the soil to the greatest depth (12 to 24 inches) but generally results in a minimal amount of mixing.

The best method for addressing sedimentation is **prevention,** since soil quality generally decreases as the depth of sediment deposition increases.

Prevent soil erosion in upstream landscape positions by maintaining plant or crop residue cover, high infiltration rates, and minimal runoff.

Conservation practices on upstream watersheds reduce the risk of high volume flooding and damaging sediment deposition. Dikes, levees, and intercepting channels are used to provide local protection from some flooding and sediment deposition.

Relationships between the depth and type of sediment deposit and damage to soils on flood plains relative to crop yield are shown in the following table. An estimate of the amount of recovery and the length of time required are made with the assumption that the flooding was a one-time event and would not reoccur.

	Depth and Texture	Damage Pct	Recovery Period Yrs	Damage Remaining After Recovery Pct
4 - 8"	fine sand and silt coarse sand and silt	20	5	0
4 - 8"	medium sand coarse sand	40	10	10
8 - 12"	fine sand coarse sand	40	10	10
12 - 14"	coarse sand	60	20	30
12 - 24"	coarse sand and gravel	90	30	50

(from Technical Release No. 17, Geologic Investigations for Watershed Planning, USDA, SCS, 1966**)**

(Prepared by National Soil Survey Center in cooperation with the Soil Quality Institute, NRCS, USDA)
