

TECHNICAL NOTES

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USE AND ABUSE OF THE UNIVERSAL SOIL LOSS EQUATION

The following technical information was prepared by the USDA, SCS, West Technical Service Center, Portland, Oregon. It contains information concerning the designed uses and obvious abuses of the Universal Soil Loss Equation (USLE) and should be helpful in obtaining a better understanding of the USLE.

Designed Uses of Universal Soil Loss Equation (USLE)

- To predict soil losses from sheet and rill erosion only.
- Predicts soil eroded from a particular slope segment.
- Predicts average annual soil movement from a given field slope under specified conditions of land use and management.
- Assists in selecting conservation practices for specific sites.
- Estimates reduction of soil loss through changes made in cultural or management practices.
- Provides local soil loss data for SCS and others to use in evaluating erosion control needs.
- Estimates soil losses from cropland, pasture, rangeland, woodland, construction, and other land areas.

Confidence Limits

Soil losses computed by the equation are best available estimates - not absolute data.

Confidence limits are affected by:

- Accuracy in selecting and applying factor values
- R - Rainfall and runoff erosivity
 - K - Soil Erodibility
 - L - Slope length
 - S - Slope steepness and shape
 - C - Cover and management variables
 - P - Practices, i.e., contouring and stripcropping

Obvious Abuses

- Evaluating factors on too broad a base, i.e., applying K, LS, and C factors over large land areas without adequately weighing these values by differences expressed in the mix of soils, topography, land use, and management of the area.
- Extrapolating factor relationships far beyond the range of data from which they were derived.
- Defining slope length incorrectly.
- Equating "T" values directly with sediment transport and water quality. "T" values, assigned by kind of soil, designate the maximum average annual soil loss that can be permitted and still maintain the productive capacity of the soil. Preserving or improving water quality is a consideration separate from the purpose of the T value.

Deposition of soil eroded from parts of fields may commonly occur within the same fields with little sediment transport to watercourses. No deposition equation is presently available.

- Attempting to apply the equation to estimate soil losses from specific rainfall events (only long-term averages for a particular time period can be used to anticipate soil losses which will occur during that period).

How to Avoid Abuses

- Achieve better understanding of the USLE and improve technical competence in its use by SCS personnel and others.
 - Develop training strategies involving key personnel at each level of service operation;
 - Emphasize training of area office staff to provide expert ongoing assistance and followup to field offices in qualifying field personnel in use of the equation; and
 - Include this as an item in each training plan for all personnel engaged in planning and application of resource management systems.

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