

## §610.5

for installing practices, and (4) certifying that the work done is in accordance with NRCS standards and specifications.

[42 FR 38169, July 27, 1977, as amended at 47 FR 56473, Dec. 17, 1982]

### §610.5 Interdisciplinary assistance.

Technical assistance is based on the principle that soil, water, plant, and related resources are interdependent and must be managed accordingly. Soil conservationists integrate the various technical fields in providing for the conservation of land and water resources. Staff scientists and specialists develop conservation standards, prepare necessary specifications, provide training, and review work performance. NRCS uses consultants for conservation problems that require special expertise.

## Subpart B—Soil Erosion Prediction Equations

SOURCE: 61 FR 27999, June 4, 1996, unless otherwise noted.

### §610.11 Purpose and scope.

This subpart sets forth the equations and rules for utilizing the equations that are used by the Natural Resources Conservation Service (NRCS) to predict soil erosion due to water and wind. Section 301 of the Federal Agriculture Improvement and Reform Act of 1996 (FAIRA) and the Food Security Act, as amended, 16 U.S.C. 3801-3813 specified that the Secretary would publish the universal soil loss equation (USLE) and wind erosion equation (WEQ) used by the Department within 60 days of the enactment of FAIRA. This subpart sets forth the equations, definition of factors, and provides the rules under which NRCS will utilize the USLE, the revised universal soil loss equation (RUSLE), and the WEQ.

### §610.12 Equations for predicting soil loss due to water erosion.

(a) The equation for predicting soil loss due to erosion for both the USLE and the RUSLE is  $A = R \times K \times LS \times C \times P$ . (For further information about USLE see the U.S. Department of Agriculture Handbook 537, "Predicting

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Rainfall Erosion Losses—A Guide to Conservation Planning," dated 1978. Copies of this document are available from the Natural Resources Conservation Service, P.O. Box 2890, Washington, DC 20013. For further information about RUSLE see the U.S. Department of Agriculture Handbook 703, "Predicting Soil Erosion by Water: A Guide to Conservation Planning with the Revised Universal Soil Loss Equation (RUSLE)." Copies may be purchased from the National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161.)

(b) The factors in the USLE equation are:

(1) *A* is the estimation of average annual soil loss in tons per acre caused by sheet and rill erosion.

(2) *R* is the rainfall erosivity factor. Accounts for the energy and intensity of rainstorms.

(3) *K* is the soil erodibility factor. Measures the susceptibility of a soil to erode under a standard condition.

(4) *LS* is the slope length and steepness factor. Accounts for the effect of length and steepness of slope on erosion.

(5) *C* is the cover and management factor. Estimates the soil loss ratio for each of 4 or 5 crop stage periods throughout the year, accounting for the combined effect of all the inter-related cover and management variables.

(6) *P* is the support practice factor. Accounts for the effect of conservation support practices, such as contouring, contour stripcropping, and terraces on soil erosion.

(c) The factors in the RUSLE equation are defined as follows:

(1) *A* is the estimation of average annual soil loss in tons per acre caused by sheet and rill erosion.

(2) *R* is the rainfall erosivity factor. Accounts for the energy and intensity of rainstorms.

(3) *K* is the soil erodibility factor. Measures the susceptibility of a soil to erode under a standard condition and adjusts it bi-monthly for the effects of freezing and thawing, and soil moisture.

(4) *LS* is the slope length and steepness factor. Accounts for the effect of

length and steepness of slope on erosion based on 4 tables reflecting the relationship of rill to interrill erosion.

(5) *C* is the cover and management factor. Estimates the soil loss ratio at one-half month intervals throughout the year, accounting for the individual effects of prior land use, crop canopy, surface cover, surface roughness, and soil moisture.

(6) *P* is the support practice factor. Accounts for the effect of conservation support practices, such as cross-slope farming, stripcropping, buffer strips, and terraces on soil erosion.

#### § 610.13 Equations for predicting soil loss due to wind erosion.

(a) The equation for predicting soil loss due to wind in the Wind Erosion Equation (WEQ) is  $E = f(KCLV)$ . (For further information on WEQ see the paper by N.P. Woodruff and F.H. Siddaway, 1965, "A Wind Erosion Equation," Soil Science Society of America Proceedings, Vol. 29, No. 5, pages 602-608, which is available from the American Society of Agronomy, Madison, Wisconsin. In addition, the use of the WEQ in NRCS is explained in the Natural Resources Conservation Service (NRCS) National Agronomy Manual, 190-V-NAM, second ed., Part 502, March, 1988, which is available from the NRCS, P.O. Box 2890, Washington, DC 20013.)

(b) [Reserved]

(c) The factors in the WEQ equation are defined as follows:

(1) *E* is the estimation of the average annual soil loss in tons per acre.

(2) *f* indicates the equation includes functional relationships that are not straight-line mathematical calculations.

(3) *I* is the soil erodibility index. It is the potential for soil loss from a wide, level, unsheltered, isolated field with a bare, smooth, loose and uncrusted surface. Soil erodibility is based on soil surface texture, calcium carbonate content, and percent clay.

(4) *K* is the ridge roughness factor. It is a measure of the effect of ridges formed by tillage and planting implements on wind erosion. The ridge roughness is based on ridge spacing, height, and erosive wind directions in relation to the ridge direction

(5) *C* is the climatic factor. It is a measure of the erosive potential of the wind speed and surface moisture at a given location compared with the same factors at Garden City, Kansas. The annual climatic factor at Garden City is arbitrarily set at 100. All climatic factor values are expressed as a percentage of that at Garden City.

(6) *L* is the unsheltered distance. It is the unsheltered distance across an erodible field, measured along the prevailing wind erosion direction. This distance is measured beginning at a stable border on the upwind side and continuing downward to the nonerodible or stable area, or to the downwind edge of the area being evaluated.

(7) *V* is the vegetative cover factor. It accounts for the kind, amount, and orientation of growing plants or plant residue on the soil surface.

#### § 610.14 Use of USLE, RUSLE, and WEQ.

(a) All Highly Erodible Land (HEL) determinations are based on the formulas set forth in 7 CFR §12.21 using some of the factors from the USLE and WEQ and the factor values that were contained in the local Field Office Technical Guide (FOTG) as of January 1, 1990. In addition, this includes the soil loss tolerance values used in those formulas for determining HEL. The soil loss tolerance value is used as one of the criteria for planning soil conservation systems. These values are available in the FOTG in the local field office of the Natural Resources Conservation Service.

(b) RUSLE will be used to:

(1)(i) Evaluate the soil loss estimates of conservation systems contained in the FOTG.

(ii) Evaluate the soil loss estimates of systems actually applied, where those systems were applied differently than specified in the conservation plan adopted by the producer or where a conservation plan was not developed, in determining whether a producer has complied with the HEL conservation provisions of the Food Security Act of 1985, as amended, 16 U.S.C. §3801 *et seq.*, set forth in 7 CFR Part 12; and

(2) Develop new or revised conservation plans.