

7. RESEARCH NEEDS

Whenever a model is developed, there are areas not included because of lack of data. This was true with the Wind Erosion Equation, and is true with the Revised Wind Erosion Equation. The following areas need further study to provide additional insight into wind erosion mechanics and improve wind erosion estimates.

7.1 FREEZE and THAW

A routine is needed to describe the changes in soil surface conditions as a result of freeze/thaw or overwinter effects. The soil surface resulting from freeze/thaw may be highly resistant or susceptible to wind erosion.

Some data have been collected but the highly divergent results make it difficult to model the process. The soil-erosion-weathering relationships are very complex since the freeze/thaw effect is dependent upon the moisture status of the soil when it is frozen in the fall.

7.2 PM-10 or SUSPENSION

Erosion of soils by wind may produce tremendous clouds of visible dust, but the concentrations of very fine particles (*i.e.* less than 10 microns) within the dust cloud have not been defined for most agricultural situations. Traditional PM-10 instruments have been placed in agricultural fields, but the measurements of PM-10 have been questioned because the instruments collect significant numbers of large particles.

7.3 CROP GROWTH TIED TO WEATHER

The present crop growth coefficients are a mathematical expression of the cover crop data. Crop canopy development should be tied to weather files to avoid the appearance of good canopy cover in areas where rainfall may not be sufficient for the crop to survive.

The Pendleton wheat growth model is being evaluated to see if it can be adapted for RWEQ.

7.4 WINDBARRIER GROWTH AND DECOMPOSITION

In the RWEQ model, the effect of windbarriers is immediate. The barrier is fully developed whenever the operator inputs the barrier characteristics. A routine is needed to grow and then decay annual crop barriers. Barrier crop growth coefficients would grow a barrier like a normal crop. This routine would output plant height and silhouette to be used after frost (or maturity) to begin the decomposition routine.

7.5 **ORGANIC SOILS**

Field erosion data are being collected in Florida. These data are essential to properly express the factors commonly used in RWEQ, but for organic soils. Factors include soil erodibility, transport capacity, and surface roughness.

7.6 **RANGELANDS**

To use RWEQ for rangeland erosion requires the operator to make major assumptions for soil and plant conditions. Data are being collected from rangelands in the El Paso, Texas area to test a modified version of RWEQ for rangelands (RWEQR). The basic physics is the same but expressions for non-uniform plant populations, uneven surface roughness, and variable soil erodibility must be incorporated.