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S.O.S. 2 - Save Our Soil, Phase Two

The objective of this study is to determine how crop residue and environmental factors affect precipitation storage efficiency (PSE) in no-till (NT) and conventional till (CT) systems in the fallow period between wheat crops. Soil water and weather data were collected from 1996-2006 in a long-term crop rotation study at Akron, CO. Fallow was divided into three periods: Period 1 (first summer [July-September]) Period 2 (fall-winter-spring [October-April]) Period 3 (second summer [May-September]). Treatment differences were tested with a paired T-test. Influence of environmental conditions was tested with a Best Subset Regression procedure. NT resulted in greater PSE during the first two periods of fallow, but there was no difference in PSE during Period 3 that could be attributed to tillage treatment. Three inches more water was stored in the soil with NT than with CT. Important environment factors affecting PSE in Period 1 were residue amount, precipitation, snow, and air temperature during the period. The factors controlling PSE in Period 2 were residue amount, snow, air temperature, and wind speed during the period. PSE during Period 3 was not affected by amount of residue, but was most influenced by precipitation, snow, vapor pressure deficit, and wind speed during the period. Many factors influence evaporation of water and vary greatly from day to day and year to year. These factors interact with each other in complex ways. Therefore, it is very hard to determine which factors and conditions most consistently influence soil water storage and PSE.