

## **Impact of precipitation and runoff on ephemeral gully development in cultivated croplands**

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**Abstract** The goal of this study was to estimate the impacts of precipitation and runoff on ephemeral gully development. A field experiment was conducted during the summer of 2013 on an agricultural field near the city of McPherson in central Kansas, USA. Precipitation data were collected, and the gully headcut was measured every three to four weeks. The rainfall excess was calculated with the WEPP model, whereas headcut soil losses were estimated based on measurements. Headcut measurements showed that there was no gully development during rainfall events of short duration of high or low intensity. However, headcut propagation was clearly detected under saturated soil conditions for a three-day storm. This field study provides data to model the mechanics of ephemeral gully development. Further measurements of precipitation and gully morphology are needed for statistical analysis of gully erosion and the associated soil losses.

**Key words** ephemeral gullies; soil erosion; soil moisture; runoff