

## **Danish experiences with buffer zones to capture sediment and phosphorus**

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### Abstract

An investigation of rill erosion, surface runoff and storage of sediment and phosphorus in buffer zones was conducted during three winters (1997/98-1999/2000) on ca. 140 arable field slope units situated within twenty localities in Denmark covering all landscape types, climate gradients and dominant soil types. The dominant soils on the slope units are Alfisols and Spodosols, with textural composition typically ranging from sand to loam. The average slope of the 140 slope units is 7% (range: 2-20%) and median buffer zone width was 8.3 m (range: 0.6-125 m). The geometric mean annual rill erosion was  $0.33 \text{ m}^3 \text{ ha}^{-1}$  equalling to  $495 \text{ kg sediment ha}^{-1}$  and  $0.25 \text{ kg P ha}^{-1}$ . The deposition of sediment on the field, in the buffer zone and delivery of soil to the stream was surveyed within the 140 slope units following three winters of 1997/98, 1998/99 and 1999/2000. Deposition of sediment in the buffer zone was observed in 31% (1997/98), 31% (1998/99) and 29% (1999/2000) of the slope units. Delivery of soil across the edge of the stream was observed in 23% (1997/98), 17% (1998/99) and 25% (1999/2000) of the 140 slope units. A probability model was developed that enable us to predict the efficiency of different widths of buffer zones along stream channels to prevent delivery of soil material and associated phosphorus to the stream dependent on the sizes of rills within a slope unit.