

Estimating the annual sediment yield of a small agricultural catchment in central Poland

KAZIMIERZ BANASIK, DARIUSZ GÓRSKI, ZBIGNIEW POPEK & LESZEK HEJDUK

Warsaw University of Life Sciences – SGGW, Department of Water Engineering, 166 Nowoursynowska str., PL-02-787 Warsaw, Poland
kazimierz_banasik@sggw.pl

Abstract The annual sediment yield of a small (91 km²) agricultural catchment in central Poland has been estimated, based on river flow measurements and catchment characteristics, and verified by reservoir surveys. Although soil erosion rates and sediment yields in this part of Poland are generally seen as low by global standards, reservoir sedimentation is a problem and there is a need to develop and validate a method for estimating catchment sediment yields. In this investigation, the suspended sediment input to a reservoir, has been estimated using the Universal Soil Loss Equation coupled with a sediment delivery ratio (USLE-SDR). The annual bed load has been estimated based on the flow duration curve and three different bed load formulae. The reservoir surveys were carried out four times between 1980 and 2009. Between 1980 and 2009 the reservoir lost approx. 13% of its capacity. A close agreement was found between the amount of sediment deposited in the reservoir and the sediment input estimated using the USLE-SDR and the bed-load formulae.

Key words sediment yield; sediment delivery; sediment budget; reservoir sedimentation; USLE; bed load formulae; Poland