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Investigating sediment productivity and spatial pattern of erosion risk in Tangkhezri basin, southwestern Iran, utilizing GIS

Investigating spatial patterns for erosion risk is vital in assessment of potential sediment production in basins and hydraulic structures performance over time. In this research, Tangkhezri basin, a typical basin in a semi-arid region with an area of 282 km^2, a mean elevation of 2443m above mean sea level, and a mean slope of 20.46% located at southwestern Iran, was studied. MPSIAC empirical method was utilized to estimate annual sediment productivity and the results were compared with measured sediments at a check dam at the basins outlet. For this purpose, spatial distribution of nine factors affecting sediment productivity (Geological characteristics, soil, climate, runoff, topography, vegetation cover, land use, surface and gully erosion) were investigated over the basin utilizing GIS. Then, Sediment Delivery Ratio (SDR) was calculated and spatial pattern of erosion risk was investigated. Finally, annual erosion volume per square kilometer was derived. Results shows that this erosion amount is significant, specially at high slopes, and it is ~1368 (m^3/km^2-yr) over the entire basin. The findings can help local decision makers make better sediment discharge assessments and manage or restore the dam reservoir and the entire basin more effectively, from ecosystems and erosion risk perspectives.

Keywords: Erosion risk, MPSIAC, Sediment productivity, SDR, GIS, Basin scale, Iran