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Evaluation of soil erosion in Northern Algeria watershed using SWAT and RUSLE models

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Abstract : Soil water erosion is a major phenomenon that threatens almost all watersheds in the Mediterranean area, nowadays. The worsening of this phenomenon in Algeria affects soil capacity to ensure its ecological functions and socio-economic purposes which depend on it. Concurrently, the storage capacity of Algeria dams has considerably decreased as a result of excessive silting. The above issue motivated this study, which aims to establish mechanisms for prioritizing to improve the economic efficiency of agricultural land and the long-term viability of dams in the largest metropolitan basin of Algeria 'Coastal Algiers 2a basin'. This basin, which is urbanized over 50% of its area, contains six large dams with a total capacity of 540 Million m^3 and one of the most important agricultural zones in Algeria. Common decision support frameworks have been implemented to predict the areas that are potentially exposed to erosion and sediment deposition threatening the dam capacity using the Soil and Water Assessment Tool (SWAT) and the Revised Universal Soil Loss Equation (RUSLE). To achieve this, rainfall, climatic, hydrometric, land use, soil, digital elevation, and satellite data were used by the two spatially soil loss models. The results show a dependency between the two statistical models with respect to low, medium and high erosion risk areas and its evolution from the eastern to the western region of the watershed. Regarding the deposition of sediments at the dams, the two models only partially explain the rate of sediments observed at the level of the dams' basins whose relative errors exceed 4%, 8%, 60%, 30% and 40% respectively for the Meurad, Bouroumi, Keddara, Boukerdane and El Hamiz dams. The canonical analysis (CC) revealed that the average slope, vegetation cover and the available water capacity in the soil of the basin are the most important parameters influencing the soil loss provided by the two models.

Key words : Soil water erosion Coastal Algiers remote sensing dam erosion risk areas canonical analysis

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