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## SWAT Model Application to Assess the Impact of Intensive Corn-farming on Runoff, Sediments and Phosphorous loss from an Agricultural Watershed in Wisconsin

PDF (Size: 779KB) PP. 423-431 DOI : 10.4236/jwarp.2012.47049

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### ABSTRACT

The potential future increase in corn-based biofuel may be expected to have a negative impact on water quality in streams and lakes of the Midwestern US due to increased agricultural chemicals usage. This study used the SWAT model to assess the impact of continuous-corn farming on sediment and phosphorus loading in Upper Rock River watershed in Wisconsin. It was assumed that farmers in the area where corn was rotated with soybean would progressively skip soybean for continuous corn as corn became more profitable. Simulations using SWAT indicated that conversion of corn-soybean to corn-corn-soybean would cause 11% and 2% increase in sediment yield and TP loss, respectively. The conversion of corn-soybean to continuous corn caused 55% and 35% increase in sediment yield and TP loss, respectively. However, this increase could be mitigated by applying various BMPs and/or conservation practices such as conservation tillage, fertilizer management and vegetative buffer strips. The conversion to continuous corn tilled with conservation tillage reduced sediment yield by 2% and did not change TP loss. Increase in P fertilizer amount was roughly proportional to increase in TP loss and 11% more TP was lost when fertilizer was applied four months before planting. Vegetative buffer strips, 15 to 30 m wide, around corn farms reduced sediment yield by 51 to 70% and TP loss by 41 to 63%.

### KEYWORDS

Watershed Modeling; SWAT, Runoff; Sediment Yield; Phosphorus Loss; BMPs

### Cite this paper

E. Mbonimpa, Y. Yuan, M. Mehaffey and M. Jackson, "SWAT Model Application to Assess the Impact of Intensive Corn-farming on Runoff, Sediments and Phosphorous loss from an Agricultural Watershed in Wisconsin," *Journal of Water Resource and Protection*, Vol. 4 No. 7, 2012, pp. 423-431. doi: 10.4236/jwarp.2012.47049.

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