B-24: Modelling non-point source pollution risk at Nilambe catchment

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Non-Point Source (NPS) agricultural pollution is a major contributing factor in polluting surface waters in agricultural areas. Agricultural Non-Point Source Pollution (AGNPS) is a single storm based model which estimates runoff, sediments, and nutrient transport primarily from agricultural catchments. The objective of this study was to apply AGNPS model to Nilambe sub catchment to identify the pollution risk in terms of sediment and nutrients production.

The time invariant parameters of AGNPS model were derived from land use/cover map, soil erodibility map and topographic map. Point rainfall measurements were the only temporal data set available for modelling. AGNPS model has provisions to introduce the amount of rainfall, duration and the storm type in place of rain energy and intensity. The modelling results were obtained for the sediment and pollutants in terms of Chemical Oxygen Demand (COD), nitrogen and phosphorus and the catchment was zoned based on the magnitude of the pollutants generated at each land parcel. The pollution density index was calculated to compare the effects of management practices on NPS pollution.

The simulated sediment yield for 1991/92 is 3.87 mt/ha. Nitrogen and phosphorus outputs for the simulated storms are 0.1 kg/ha.. and the COD is 0.2 ppm. In the 24 h 100 mm storm, the area weighted total upland erosion is 25 times higher than that of the 22.5 mm event. The total sediment yield is 297 times between these two storm events. Similarly, 100 mm storm has produced delivery ratio of 97% while 22.5 mm storm has resulted in 36%. According to the results, the entire catchment is not critical in COD production. Although concentrations of nitrogen and phosphorus in sediments are high, the same nutrients in runoff are not critical.