A Paired watershed Evaluation of Agroforestry effects on Water Quality on a Corn/Soybean Rotation

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Rigorous long-term scientific studies confirming environmental benefits from the use of agroforestry practices are limited and thus limit the adoption of agroforestry practices throughout the world. The objective of the study was to examine non point source pollution (NPSP) reduction by agroforestry buffers in row-crop watersheds. The study consists of three watersheds in a paired watershed design in Knox County, Missouri, USA. Watersheds were established in 1991 and treatments of agroforestry (trees+grass) and grass buffers were established on two watersheds in 1997 after a 7-year calibration period. Runoff water samples were analyzed for sediment, total nitrogen (TN) and total phosphorus (TP) for the 2009 to 2010 period. Results indicated that agroforestry and grass buffers on row crop watersheds significantly reduce runoff, sediment, TN, and TP losses to streams. Buffers in association with row crop management reduced runoff by 26% during the study period as compared to the control treatments. Average sediment loss for row crop management and buffer watersheds was 14.8 and 9.7 kg ha-1 yr-1 respectively. On average, grass and agroforestry buffers reduced sediment, TN, and TP losses by 32, 42, and 46% compared to the control treatments. These differences could in part be attributed to the differences in management, soils, and landscape features. Results from this study strongly indicate that agroforestry and grass buffers can be implemented to reduce NPSP to water bodies while improving land value and environmental quality.