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## Do conservation practices contribute to the sustainability of soils in row crop agriculture?

**Martin Locke**

USDA ARS, National Sedimentation Laboratory, United States of America (martin.locke@usda.gov)

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In row crop agriculture in the United States, so called conservation practices such as reduced tillage and cover crops are promoted as a means to improve the condition of soil (i.e., soil health, soil quality, soil sustainability). In a series of studies conducted in the alluvial plain of the Mississippi River, various conservation practices were implemented, and several parameters were measured to determine how these practices influenced soil conditions. Conservation management practices in corn or cotton production systems included reduced tillage, cover crops, and a government sponsored called Conservation Reserve Program, or CRP, where land is removed from agricultural production and replanted with native species as a fallow or buffer area. Synthesized conclusions from the reduced tillage and cover crop studies showed that: (a) Cover crop and reduced tillage resulted in modest increases in soil organic carbon and nitrogen; (b) Soil biological activity was enhanced by cover crops (e.g., enzymes, mycorrhizae); (c) Runoff losses of solids was reduced with no-tillage and cover crop; (d) The phosphorus and nitrogen associated with runoff solids were reduced with cover crop and no-tillage; (e) Soluble phosphorus and nitrogen in runoff was variable; at times higher with cover crop and no-tillage; (f) cotton and corn grain production in cover crop and reduced tillage systems did not differ from that of conventional systems. Three years after implementing CRP, microbial biomass, enzyme activities (phosphatase, glucosidase, and N-acetylglucosaminidase), and soil carbon and nitrogen in the surface of CRP soils were higher than in adjacent row crop soils. Loss of some nutrients in runoff from the CRP was lower than that of row crop areas. These two studies indicate that conservation practices can improve some environmental parameters related to soil sustainability. Economics needs to be evaluated to determine the sustainability of maintaining these systems.