Eastern Corn Belt Long-Term Agro-Ecosystem Research Network (LTAR)

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Summary: Intensive agricultural production in the ECB (specifically the Ohio River Basin and the Great Lakes Region) region has caused excessive nutrient and pesticide loads to the streams and lakes. The ECB is one of the most agriculturally important regions in the US. The combination of glacially derived, low permeability soils and the cool humid climate make for a very productive but highly sensitive ecosystem. Besides agricultural chemical issues, how to properly manage water on poorly drained lake plain soils and to reduce erosion and sedimentation from fields and in channels and streams are major challenges in this region. This LTAR network addresses nationally known water quality and ecological issues in the Western Lake Erie Basin, Grand Lake St. Mary, and the Gulf of Mexico (from the Ohio River). The ECB node consists of an extensive network of long-term research sites and monitoring stations, ranging from plot and edge-of-field sites and small watersheds to large watersheds draining into Lake Erie or the Ohio River.

Research should focus on soil erosion and nutrient transport impacts from row crop production with an emphasis on drained lands under an ever changing climate. Row crop agriculture primarily consists of corn-soybean rotation with wheat interspersed in some rotations. The primary tillage is characterized as rotational tillage (disk-chisel prior to corn planting). Subsurface drainage is necessary for crop production on the soils with drainage classifications ranging from somewhat poorly drained to very poorly drained. This drainage is primarily in a “free drainage” mode; that is, the tile drainage system is allowed to flow freely throughout the year.

Research Emphasis

Determine the water quantity and quality benefits of implementing drainage water management.

Quantify the water quality impacts of structural practices such as ‘blind inlets’ and ‘enhanced woodchip bioreactors.’

Evaluate the impacts of a various cropping systems (e.g., rotational tillage vs no-tillage; cover crops vs no cover crops; 4R implementation)