IMPACT OF IRRIGATION ON CARBON STRATIFICATION IN CALCAREOUS SOILS

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Abstract

Human activities contribute to the production of greenhouse gases through higher use of technology and industrialization and increased inputs in production in agricultural sectors. Agriculture releases three primary greenhouse gases (CO_2, CH_4 and N_2O) to atmosphere which are responsible for climate change. The proper agricultural management systems can be a sink for CO_2 through C sequestration into organic matter through biomass production. Irrigation may or may not change of soil carbon in a desirable direction. We measured soil organic carbon (SOC) and soil inorganic carbon (SIC) in irrigated and non irrigated calcareous soils for better understanding of the altering of soil carbon. Soil samples were collected from three soil series: Sara (Silt to Silt loam), Gopalpur (Silt loam to Silty clay loam) and Ishurdi (Silt loam to clay), located in same catena at 0-25 cm, 25-50 cm, 50-75 cm and 75-100 cm depth of irrigation project as well as adjoining non irrigated area of Ganges-Kobadak of Bangladesh. Soil organic carbon increased in irrigated soils but decreased in non irrigated soils. The opposite trend was observed for SIC. Soil organic carbon density was in the order of Sara>Goplapur>Ishurdi and SIC while in case of SIC it was in the order of Sara<Gopalpur<Ishurdi, regardless of management practices. Stratification ratios of total carbon were higher in non irrigated than irrigated soils. Stratification ratios of soil total carbon were 0.88, 0.70 and 0.56 under irrigated soils and 0.92, 1.07 and 0.72 under non irrigated soils in Sara, Gopalpur, and Ishurdi series, respectively. Our result indicated that irrigation practices may increase SOC carbon but decrease in SIC in calcareous soil. Therefore, the ways to change of carbon levels depend on forms of carbon and the overall impact of irrigation in calcareous soil is negative on soil carbon storage.

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