Impact of nitrogen fertilizer, management practices on yield-scaled nitrous oxide emission from corn and soyabean agri-field: A meta-analysis

In global scale, nitrous oxide (N_2O) emission from maize and soyabean field is still lacking. This meta- analysis study examined the impact of fertilizer application on N_2O emissions based on 153 peer-reviewed papers. Inorganic fertilizers (mainly synthetic) as well as Organic amendments (animal manure, straw and biochar) can influence the nitrous oxide (N_2O) emission. Climate variable (MAT, MAP) can influence the N_2O emission after fertilizer application. After analyzing the initial meta-data, we found that C: N ratios of manure, straw, biochar significantly affect N_2O emissions. The meta-analyses also revealed that reducing N fertilizers, water-saving irrigation, reduced or no tillage, and applying efficiency fertilizers tend to decrease N_2O emissions. Conclusively, this Study summarized the effects of soil physical and chemical characteristics (Soil Organic Carbon, Soil pH, Bulk density, Total Nitrogen), management practices (Tillage, irrigation) and nutrient amendment as well as climatic condition on nitrous oxide (N_2O) emission and grain yield at various agro-climatic zone across the world. This meta-analysis will aid to quantify N_2O emissions at various agro-climatic spatial variation. This study will help to budget global N_2O, and polish the N_2O mitigation protocols. This study was supported by the USDA and NSF projects.