Article title	Quantify Climate Mitigation Role of Enhanced Efficiency Fertilizers and Practices.
Authors	Mainul Ahsan, Upendra Singh, Job Fugice, Katherine Glass, & Yam Kanta Gaihre
Abstract	Agriculture plays a crucial role in climate mitigation by sequestering carbon (C) and improving soil organic matter content. Enhanced efficiency fertilizers and practices that result in increased yield and improved nutrient use efficiency (NUE) should also result in reduced nutrient losses and increased C sequestration. A 15-25% increase in rice grain yield generally occurs with urea deep placement (UDP) compared to broadcast urea (split-applied). It is anticipated that root biomass accumulation with deep-placed urea would be at least 10-20% more compared with biomass accumulation with broadcast urea. The deep placement of urea has been shown to reduce or eliminate the diffusion of NH4-N into floodwater and, hence, substantially reduce NH3 volatilization loss and N2O emission. It also is expected that deep placement slows the diffusion of CO2 formed during hydrolysis of urea into the floodwater and atmosphere. Given the above, UDP management under flooded conditions is expected to result in C sequestration and soil organic matter buildup. A total of 540 soil samples were collected from rice fields in Bangladesh that have been under UDP practice from three to 20 years and from rice fields where only broadcast application of prilled urea was used. All samples were analyzed for: organic C, total N, and soil pH. Significant differences in soil organic matter (SOM) were observed between fields that were under rice-rice cropping versus dry season rice-fallow. Overall, the deep placement of urea resulted in significant increase in SOM, particularly in the rice-rice cropping system. The increase in SOM with UDP compared to broadcast urea application differed with location. Managing SOM is complex because of soil, hydrology, temperature, cropping system, and management effects and their interactions. Improved fertilizer management, such as deep placement, resulted in significant increase in SOM in intensified rice-rice cropping without any negative effect on rice yield.
Publication date	2018-11-05
Article link	https://scisoc.confex.com/scisoc/2018am/meetingapp.cgi/Paper/111745