

2nd World Congress on CLIMATE CHANGE AND ENVIRONMENTAL HEALTH

March 25-26, 2022 | Webinar

IMPACTS OF FERTILIZER AND WATER MANAGEMENT ON GREENHOUSE GAS EMISSIONS FROM RICE CULTIVATION IN BANGLADESH**S.M. Mofijul Islam***Bangladesh Rice Research Institute, Bangladesh*

Efficient N management such as urea deep placement (UDP) and water saving irrigation alternate wetting and drying (AWD) are critical to increase rice yields, nitrogen use efficiency (NUE) and mitigate greenhouse gas (GHG) emissions. However, studies on the impacts of UDP and integrated plant nutrient system (IPNS) that combines organic inputs and inorganic fertilizer with different irrigation regimes on GHG emissions and yield in rice cultivation are limited. We conducted multiyear field experiments during the dry seasons to compare the effects of four fertilizer treatments including control (no N), prilled urea (PU), UDP and IPNS (integrated use of poultry manure and PU) with two irrigation regimes (AWD and continuous flooding, CF) on GHG emissions and rice yield. CH₄ and N₂O emissions were measured using the closed chamber technique and their concentrations were determined using a gas chromatograph. CH₄ and N₂O emissions varied across fertilizer treatments and irrigation regimes. UDP significantly ($p < 0.05$) reduced cumulative CH₄ emissions compared to PU and IPNS treatments, respectively. Across the year and fertilizer treatments, AWD irrigation significantly ($p < 0.05$) reduced cumulative CH₄ emissions, and GHG intensity without any yield penalty compared to CF condition. Although AWD irrigation increased cumulative N₂O emissions by 73%, it reduced the total global warming potential by 27% compared to CF irrigation. Across the irrigation regimes, UDP significantly increases rice yield compared to PU. These results suggest that both UDP and AWD irrigation might be considered as a carbon-friendly technology.

Biography

S. M. Mofijul Islam is a Senior Soil Scientist of Bangladesh Rice Research Institute (BRRI), Bangladesh. He has completed PhD on fertilizer and water management on N use efficiency and GHG emissions from Khulna University, Bangladesh under Agrotechnology discipline. He has published more than 24 papers in peer reviewed journals, 1 book chapter, 1 short communication, and 1 abstract. He reviewed 30 international papers of reputed journal. His Google scholar citation is 350, h-index 9 and i10-index 8.