Sugarcane Production Practices Influence Greenhouse Gas Emissions

Agriculture contributes greatly to greenhouse gas emissions, especially nitrous oxide. Determining the effect of various management practices on emissions is needed to refine current models that predict global greenhouse gas inventory.

In a two-year study published in Agrosystems, Geosciences & Environment, researchers evaluated the effect of sugarcane harvest residue management strategies (residue retain and residue burn) and nitrogen sources (urea and urea ammonium nitrate) on three greenhouse gas emissions: nitrous oxide, methane, and carbon dioxide.

Soil surface application of urea increased the nitrous oxide emission factor by 1.81 to 2.1 times compared with soil injection of urea ammonium nitrate (UAN). Compared with residue burn, residue retention both increased the nitrous oxide emission factor of urea and UAN by 26 and 47%, respectively, and caused a significant increase in methane emissions. Increased water content under residue retain had a considerable effect on these increased emissions. There was no difference in carbon dioxide emissions either by nitrogen fertilizers or harvest residue management.

These results will help sugarcane producers understand nitrogen losses due to different harvest residue management and nitrogen source regimes.

Considering the large area of 26 million ha under sugarcane, using the emission factors of nitrous oxide from this study, instead of the International Panel on Climate Change’s default value, could help to refine the current nitrous oxide emission models.