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Options and potentials to mitigate N2O emissions from wheat and maize fields in China

Wenjuan Sun and Xin Li
Institute of Botany, Chinese Academy of Sciences, China (sunwj@ibcas.ac.cn)

Upland croplands are the main source of N2O emission. Mitigation of N2O emissions from upland croplands will greatly contribute to an overall reduction of greenhouse gases from agriculture. We performed a meta-analysis to investigate the mitigation options and potential of N2O emissions from wheat and maize fields in China. Results showed that application of inhibitors in wheat and maize fields reduced36–46% of the N2O emissions with an increase in crop yield. Cutting the application rates of nitrogen fertilizers by no more than 30% could reduce N2O emissions by 10–18%without crop yield loss. Applications of slow (controlled-) release fertilizer fertilizers and incorporations of crop residues can significantly mitigate N2O emission from wheat fields, but this mitigation is not statistically significant in maize fields. The gross N2O emission could be reduced by 9.3–13.9Gg N2O-N per wheat season and 10.5–23.2 Gg N2O-N per maize season when different mitigation options are put into practices. The mitigation potential (MP) in wheat cultivation is particularly notable for Henan, Shandong, Hebei and Anhui Province, contributing 53% to the total MP in wheat fields. Heilongjiang, Jilin, Shandong, Hebei and Henan Province showed high MP in maize cultivation, accounting for approximately 50% of the total MP in maize fields.