Entry No. IRRC-0209

Category	: International Rice Research Conference
Select Theme	: Climate change and environmental sustainability
Endorsement email	:
Keyword 1	: Mitigation of climate change
Keyword 2	: Climate smart agriculture
Keyword 3	: Water-energy nexus
Title of Entry	: Generalized recommendations for farmers for reducing both nitrous oxide and methane emissions from rice: Importance of monitoring flooding regimes.
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Select only one type of presentation	: 15 minute oral presentation
Abstract	: Because nitrous oxide (N2O) has a much larger climate impact and for a longer time period than methane (CH4), it is crucial that we do not choose climate mitigation strategies that will decrease CH4 but increase N2O. Our risk analysis (see our other submission) suggests that the scale of the problem of N2O emissions from global rice cultivation could be large (450–700 MMT CO2e), potentially making the net climate impact from global rice cultivation equivalent to the national GHG emissions of India or Brazil (~1500-1930 MMT CO2e). Our data shows that co-management of water, inorganic nitrogen and/or organic matter inputs can decrease climate net impacts by 60% when special attention is given to the flooding regimes. Flooding regimes should be determined both by the frequency of fluctuations in water levels above/below soil surface and the water index (WI). Here, WI is defined as the sum of daily water levels (in cm, measured around the same time daily) in a field water tube in a growing season relative to the soil surface. Based on our study, we offered the following general recommendations to farmers: ---Keep flooding shallow with WI for the whole season between -250 and 250 cm. ---Limit the number of times water stays above soil level for more than 3 days. ---Add as little inorganic N as necessary to maintain crop yields. For regions that remain intermittently flooded, add inorganic N in split doses right before a flooding event. ---Keep water levels above -5 to -7 cm during the growing season (except close to harvest) and not let them go down to -15 cm. ---For farms where water likely does not percolate down quickly (and/or WI is high), reduce organic matter use to reduce CH4 emissions. ---For farms where water likely percolates down quickly (and/or WI is low), higher amount of organic carbon can be added to reduce N2O emissions without increasing CH4 emissions. We advise that policy makers and the scientific

community undertake region-specific studies to confirm if these recommendations will help farmers get desired yields and climate benefits in a new agro-ecological regions/countries.

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