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Category	: International Rice Research Conference
Select Theme	: Climate change and environmental sustainability
Endorsement email	:
Keyword 1	: Climate smart agriculture
Keyword 2	: Soil, water, and air pollution
Keyword 3	: Water scarcity
Title of Entry	: Assessment of agronomic effects and GHG emissions comparing mechanized system of rice intensification (MSRI) with direct-seeded and normal transplanted rice in clay soils of India
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Select only one type of presentation	: 15 minute oral presentation
Abstract	: Experiments were conducted during wet and dry seasons of 2015 and 2016 (four seasons) to assess the productivity, water use efficiency, and greenhouse gas emissions with different irrigation regimes and crop-establishment methods, addressing the constraints of resource availability (land, water and labour) and climate change. The methods of MSRI (using mechanical transplanter and motorised weeder with SRI methods), drum seeding (DS, in puddled field), and standard transplanting (ST) with flooding were compared to evaluate GHG emissions as well as effects on yield, labour-saving, water productivity, and economic returns. Mean grain yield was significantly higher with MSRI (6.32 t ha-1) compared with drum seeding (5.59 t ha-1) but statistically on par with ST (6.02 t ha-1). Irrigation water productivity was significantly higher with MSRI (7.97 kg ha mm-1) vs. ST and DS (7.13 and 5.96 kg ha mm-1, respectively) due to higher yield and lower water requirements. Total cropping-season emissions of methane (CH4) were lowest with MSRI (11.64 and 20.64 kg ha-1) compared to normal transplanting (27.84 and 36.60 kg ha-1) and DS (26.04 and 32.40 kg ha-1), a reduction of 61% and 64. . Conversely, emissions of N2O-N from the soil was lower with normal transplanting than MSRI due to periodic aerobic soil conditions by mechanical weeding resulting in more NO3-N emissions through nitrification. However, when these two effects were combined, mean global warming potential was significantly lower with MSRI (3090 kg CO2 eq ha-1) compared to ST (3290 kg CO2 eq ha-1) and DS (3246 kg CO2 eq ha-1). Further the B:C ratio is higher with MSRI (2.51) over NTP and DS (2.29 and 2.16). due to less labour requirement and cost o cultivation. The findings indicated that adopting MSRI in a wider scale would be beneficial both

for mitigating global warming as well as for enhancing the productivity of land and water as wel as labour, all resource constraints for rice production in India.

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