

Category	: International Rice Research Conference
Select Theme	: Climate change and environmental sustainability
Endorsement email	:
Keyword 1	: Adaptation to climate change
Keyword 2	: Environmental sustainability
Keyword 3	: Climate smart agriculture
Title of Entry	: Greenhouse gas emission as affected by planting density under submerged condition
Presenting author	: Mohammad Shahid
Presenting author email	: shahid.vns@gmail.com
Co author 1	: Bhuneswar Verma
Co author 2	: Debarati Bhaduri
Co author 3	: Kaushik Chakraborty
Co author 4	: Rahul Tripathi
Co author 5	: Ashish Kumar Srivastava
Co author 6	: Sudhanshu Singh
Co author 7	: Amaresh Kumar Nayak
Co author 8	:
Co author 9	:
Co author 10	:
Co author 11	:
Co author 12	:
Co author 13	:
Co author 14	:
Affiliation presenting author	: Scientist, Crop Production Division, ICAR-National Rice Research Institute, Cuttack-753006, Odisha, India
Affiliation 1	: Crop Production Division, ICAR-National Rice Research Institute, Cuttack-753006, Odisha, India

Affiliation 2	: Scientist, Crop Production Division, ICAR-National Rice Research Institute, Cuttack-753006, Odisha, India
Affiliation 3	: Scientist, Crop Physiology & Biochemistry Division, ICAR-National Rice Research Institute, Cuttack-753006, Odisha, India
Affiliation 4	: Scientist, Crop Production Division, ICAR-National Rice Research Institute, Cuttack-753006, Odisha, India
Affiliation 5	: Associate Scientist-Physiology, IRRI-SARC, Varanasi, U.P. 221006
Affiliation 6	: Rainfed Lowland Agronomist, South Asia, IRRI-India, New Delhi, 110 008
Affiliation 7	: Principal Scientist & Head, Crop Production Division, ICAR-National Rice Research Institute, Cuttack-753006, Odisha, India
Affiliation 8	:
Affiliation 9	:
Affiliation 10	:
Affiliation 11	:
Affiliation 12	:
Affiliation 13	:
Affiliation 14	:
Select only one type of presentation	: 15 minute oral presentation
Abstract	: Rice ( <i>Oryza sativa</i> L.) is the world's most important crop and the primary source of food for more than half of the world's population. Submergence stress is a common environmental challenge for rice cultivation particularly under changing climatic scenario. Rice paddies are considered one of the most important sources of greenhouse gases (GHG) emissions. Modification of current cropping technique might be a way to reduce greenhouse gas emissions from rice soil. Variation in rice planting density also may influence the amount of GHG emission from rice soil. The present study was conducted to gain information about the impact of rice cultivars grown under normal and submerged conditions (10 days) with different plant spacing on GHG emission from rice paddy fields. The test variety taken was IR64 (submergence susceptible) and IR64-Sub1 (submergence tolerant) which were transplanted under normal condition and in submergence tank with two spacing i.e. 15x10 cm and 20x15 cm. Results indicated that methane (CH <sub>4</sub> ) flux increased during the early growing period and then gradually decreased toward the end of the growing period with a highest peak was observed during the panicle initiation stage under both normal and submerged condition. During the period of submergence, a sharp decline in the emission of CH <sub>4</sub> and nitrous oxide was observed. Methane emission, averaged over rice varieties, reduced for 20x15 cm spacing compared with 15x10 cm spacing. However, an increase in N <sub>2</sub> O emission was observed for 20x15 cm spacing under both normal and submerged conditions. There was no significant difference in CH <sub>4</sub> and N <sub>2</sub> O emissions between the tested varieties. Seven and fifteen days after release of the submergence treatment, the survival rate was observed and it was found that submergence tolerance cultivars (IR64-Sub1) and closer spacing (15x10 cm) plant has more survival as compared to wider spacing (20x15 cm). Under submerged condition, higher yield was observed for closer spacing and in the tolerant cultivar, whereas under normal condition no significant differences were observed among the cultivars and spacing. This study showed that the wider spacing is effective

in reducing GHG emission, however under submergence condition higher yield was obtained for closer spacing.

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