Entry No. IRRC-0192

Category	: International Rice Research Conference
Select Theme	: Climate change and environmental sustainability
Endorsement email	:
Keyword 1	: Crop residue management
Keyword 2	: Climate smart agriculture
Keyword 3	: Mitigation of climate change
Title of Entry	: Utilizing Rice Residue Biochar as Slow Release Nitrogen Fertilizer and Soil Amendment For Sustainability and Resilience
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Select only one type of presentation	: 3-5 minute flash talk
Abstract	: Residues from rice cultivation are produced in huge quantities every year in farm fields. These residues are either partially utilized or un-utilized due to various constraints or subjected to on field burning. Residues burning lead to plethora of problems such as release of soot particles and smoke causing human health problem, emission of greenhouse gases such as carbon dioxide and nitrous oxide adding to global warming, loss of plant nutrients such as N and S, adverse impacts on soil properties and wastage of valuable crop residues. Hence, conversion of residues to produce biochar using the pyrolysis process is one climate smart option that can enhance natural rates of carbon sequestration in the soil, reduce farm waste and improve the soil quality. Biochar offers one of the novel biodegradable support materials for developing controlled/ slow release nitrogen fertilizers. Therefore, a study was conducted for utilizing rice residue (husk and straw) based biochar as a support material to develop slow release nitrogenous fertilizer by detailed characterization and regulating its release kinetics. Field experiments were conducted in rice-wheat system to test the efficacy of developed biochar based fertilizers and biochar as amendment at research station of Pantnagar university. Higher agronomic efficiency (19.56 kg/kg N applied over control) and partial factor productivity (45 kg grain /kg N applied) were recorded in rice crop with application of rice straw biochar intercalated urea @ 75% of recommended N (112.5 kg/ha) with 4-5% higher grain yield as compared to recommended N (150kg/ha) through urea, recording agronomic efficiency and partial factor productivity of 13.3 kg/kg N applied over control and 32.3 kg/kg N applied, respectively. Benefit: cost ratio was also observed to be higher with application of biochar based slow release fertilizers as compared to urea application. Biochar applied as moisture conservation amendment increased the yield of over control. Therefore, biochar as slow release fertilizer and soil amendment increase nutrient use efficiency, minimize fertilizer load and improve farmer’s wealth besides addressing the issue of climate change through increased C sequestration and reduced emission of greenhouse gases. Read Less»

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