Entry No. IRRC-0038

Category	: International Rice Research Conference
Select Theme	: Climate change and environmental sustainability
Endorsement email	:
Keyword 1	: Water scarcity
Keyword 2	: Environmental sustainability
Keyword 3	: Water-energy nexus
Title of Entry	: Irrigation and nitrogen management affect yield, nitrogen uptake and soil enzymatic activities in irrigated direct–seeded rice in India
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Select only one type of presentation	: 15 minute oral presentation
Abstract	: Increasing adoption of dry direct-seeded rice (Oryza sativa L.)(DSR) practice as an alternative to puddled transplanted rice (PTR) in Asia has the potential to address labor bottlenecks and water shortage problems, and avoid some possible deleterious effects of puddling on crops grown in rotation with rice. Understanding the integrated effect of different input management practices on DSR productivity and soil quality is essential for its wider adoption. A field study was conducted at the IARI, New Delhi, India during 2015 and 2016 to evaluate different irrigation scheduling and N split application practices on yield, N uptake

and soil enzymatic activities. Treatments were established in a split plot design with three replications on a sandy clay loam soil. Main plots compared four irrigation scheduling threshold based on soil water tension: (i) 0 kPa ; (ii) +10 kPa ; (iii) +20 kPa ; and, (iv) +40 kPa from tillering to flowering and +10 kPa for the remainder of crop growth (+10/40 kPa). Sub plots evaluated three N management practices: (i) No N application, (ii) 120 kg N ha-1 as three equal split applications at sowing, active tillering and panicle initiation stages and (iii) 120 kg N ha-1 as four equal split applications at sowing, active tillering, panicle initiation and flowering stages. The irrigation scheduling at +20 kPa combined with four N split application resulted in similar grain yield to that of when irrigation scheduling at 0 kPa combined with three or four split N practice. The higher grain and total N uptake was recorded when irrigation was applied at 0 and +10 kPa compared to +20 and +10/40 kPa. The microbial biomass carbon and enzymatic activities decreased with increase in water stress from 0 kPa to +10/40 kPa at 60 DAS in 2016. Based on the findings, it can be concluded that application of three and four N splits were equally effective at 0 kPa. However, with the reduced frequency of irrigation water at +20 kPa, application of four N splits was found superior over three N splits in terms of grain yield, N uptake and water productivity.

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