

Category	: International Rice Research Conference
Select Theme	: Climate change and environmental sustainability
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Keyword 1	: Environmental sustainability
Keyword 2	: Crop residue management
Keyword 3	: Water scarcity
Title of Entry	: Optimizing sub-surface drip irrigation for conservation agriculture based rice-wheat system of South Asia
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**Abstract** : The future of the South Asia's rice-wheat (RW) production system is at stake due to continuously depleting aquifers and increasing pressure on underground water under projected climate change scenario. Conventional management factors such as flood irrigation, intensive tillage and residue burning are threatening sustainability of RW system. With increasing of adoption of conservation agriculture (CA), sub-surface drip irrigation (SSDI) provides an exceptional opportunity for complementing water saving benefits. Presently, there is no research evidence on optimum spacing and depth for drip laterals in a CA (direct drilling and residue mulch) based RW system around the globe. This study was therefore, planned to evaluate effects of residue mulch, different spacing and depths of laterals for SSDI on crop yield, irrigation water productivity (WPI), nitrogen use efficiency (NUE) and net returns for CA based RW system in a silt loam soil in northwestern India. Drip laterals were spaced either at 33.75 cm or 67.5 cm, and installation depths were 0 15 or 20 cm beneath the soil surface along with flood-irrigated RW systems. Grain yield and irrigation water input in rice and wheat were generally similar under different SSDI treatments. Irrigation water savings were 48-53% in rice and 42-53% in wheat under combination of SSDI and CA compared to flood irrigation system. A similar trend in WPI was recorded in both the crops. Residue mulch contributed to higher irrigation water savings, wheat yield and WPI compared to no mulch. Both rice and wheat needed 20% less N fertilizer under SSDI system to obtain grain yields similar to that under flood irrigated crops. Net returns from SSDI system with 67.5 cm lateral spacing were significantly higher compared to flood irrigation system. In conclusion, SSDI system having laterals spaced at 67.5 cm and installed at 15 cm depth provides novel information to the farmers for substantial water savings and increasing NUE with no yield penalty for CA based RW system in South Asia.

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