



**RESEARCH ARTICLE :**

## Optimization nutrient levels and sources of nutrients for sustainable sugarcane initiative under sub surface drip fertigation system

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**SUMMARY :** Sugarcane being a giant crop producing huge quantity biomass generally demands higher amounts of water and nutrients. Sub surface drip fertigation is the best way of improving water and fertilizer use efficiency to meet the challenging demand of increased fertilizer requirement. Sub surface drip irrigation ensures supply of nutrients at the area of most intensive root activity thereby results in increased yield and returns to the farmer. A research trial was conducted to study the effect nutrient levels and sources of nutrients for sustainable sugarcane Initiative (SSI) under sub surface drip irrigation system involving three irrigation regimes (0.6, 0.8 and 1.0 Pan Evaporation Factor, PEF) in main plots and fertigation of solely through commercial fertilizers, partially through commercial and water soluble fertilizers with different sources. The crop was raised by adopting double side plating (zig zag planting at 60 cm) with 180 cm inter row spacing. Drip irrigation given in two days interval and fertigation given at six days interval from 15 DAP to 210 DAP. The result reveals that among the irrigation regimes, sub surface drip irrigation at 1.0 PEF registered higher number of tillers, millable canes (112.99 thousands). With regard to the sources of nutrients, the highest tillers and millable canes were registered under fertigation of 75 % RDF (50 % P and K as basal, balance through water soluble fertilizers as Ultrasol – 9: 5:33, urea and SOP. The sub surface drip irrigation to SSI cane at 1.0 PEF with an interval of 2 days recorded the maximum cane (147.16 ton /ha) and sugar yield (18.41 ton/ha). Fertigation of 75 % RDF (50 % P and K as basal balance through WSF as Ultrasol – 9:5:33, urea and SOP to SSI) cane gave highest cane yield 135.04 t/ha. With respect to interaction effect, irrigation at 1.0 PEF and fertigation of 75 % RDF (50 %P and K as basal balance through WSF as Ultrasol – 9:5:33, urea and SOP) registered to highest cane yield (156.25 t/ha) and sugar yield (19.94 ton /ha). The highest water use of 1684 mm was recorded in 1.0PEF compared to 1377 mm in 0.8 PEF and 1070 mm in 0.6 PEF. The highest water use efficiency and water productivity were observed in drip irrigation given at 0.6 PEF compared to other irrigation regimes due to less water use. The highest gross income, net return and B: C ratio (4.6) was registered when irrigation at 1.0 PEF and fertigation of 75 % RDF (50 %P and K as basal balance through WSF as Ultrasol – 9:5:33, urea and SOP).

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