

Abstract

Zero Tilled-Paddy Straw Mulched Potato (*Solanum tuberosum*) Cultivation in the Coastal Saline Soils Reduce Soil Salinity, Increase Yield and Profitability [†]

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Abstract: Rice is the predominant crop during wet season (July–December) and majority of land remain fallow during dry season (January–June) in the coastal saline region of West Bengal, India. Sustainable cropping system intensification in this salt affected region needs improved package of practices which conserve soil moisture, facilitate early crop establishment, ensures profitability and has positive effect on soil health. To achieve these objectives in a rice-based cropping system, we evaluated seven treatments for potato crop during the dry season viz. T1: ridge sowing (control), T2: Zero tillage (ZT) sowing with 9 t ha⁻¹ paddy straw mulching (PSM), T3: T2 + foliar spray of nutrients, T4: ZT sowing with 12 t ha⁻¹ PSM, T5: T4 + foliar spray of nutrients, T6: ZT sowing with 15 t ha⁻¹ PSM, T7: T6 + foliar spray of nutrients in randomized block design with five replications. This study was conducted during 2016–2019 in the Gosaba island of the Indian Sundarbans. Cost of cultivation of potato reduced by about 27% due to ZT sowing (₹ 81,287 ha⁻¹) compared to ridge sowing (₹ 1,11,260 ha⁻¹). Tuber yield, net return and irrigation water productivity was significantly increased in T5, T6 and T7 over other treatments. There was reduction in soil salinity (EC_e reduced from 5 to 3 dS m⁻¹), bulk density (from 1.49 to 1.44 Mg m⁻³), irrigation water use (less 20 cm), conservation of soil moisture (4–8%), and increase in organic carbon (0.39 to 0.44%) due to ZT sowing with PSM. Rice-ZT potato-green gram cropping system was the most profitable one with highest net return (₹ 1,71,752 ha⁻¹), however, the benefit-cost ratio was highest (2.33) with Rice-ZT potato cropping system.

Keywords: bulk density; irrigation water; mulching; organic carbon; soil moisture; soil salinity; tillage

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