

Economics of zinc (Zn) fertilizer application on rice (*Oryza sativa* L.) crop under different water and soil environments

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ABSTRACT

A field experiment was conducted in an acid inceptisol of Bhubaneswar in wet season (*Kharif*) 2021 receiving high rainfall (1500 mm) and low available Zn (0.47 mg kg^{-1}). Results of the field experiment revealed that soil application of Zn 5 kg ha^{-1} ($\text{ZnSO}_4 \cdot 7\text{H}_2\text{O}$ 25 kg ha^{-1}) at last ploughing along with soil test based fertilizer dose of $100:40:50 \text{ kg N, P}_2\text{O}_5, \text{K}_2\text{O ha}^{-1}$ was optimum considering grain yield (49.2 q ha^{-1}), net return (Rs 41.2 thousand ha^{-1}) and net B:C ratio (1.68). Secondary data analysis from published research articles revealed that yield improvement due to zinc fertilizer application was highest (19.8%) for the aerobic soil followed by acidic soil (16.1%) and high pH soil (10.3%). Improvement in net return was also highest (64.7%) for aerobic soil, followed by acidic soil and high pH soil. Overall mean across the three soil water environments revealed that soil application of 5 kg zinc through water soluble $\text{ZnSO}_4 \cdot 7\text{H}_2\text{O}$ improved grain yield, net return and net B:C ratio by 13.6%, 27.2% and 25.3%, respectively. So, Zn fertilizer application is needed most in deficient aerobic soil followed by acidic soils of high rainfall areas, and high pH soils in rice cultivation.

Key Words: *Aerobic rice, Acidic soil, Cost of cultivation, Net B:C ratio and Net return*