

Article title	Zinc application rate for optimal profitability of maize production systems in the savanna agroecological zones of Northern Ghana
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Abstract	<p>Although the critical role of zinc (Zn) in maize nutrition and productivity is well documented, there is still a need to determine the most economically justifiable Zn application rate for maize production, particularly in the savanna agroecological zones (AEZs) of northern Ghana where such study is lacking. In a three-year study at six locations across the AEZs, we compared seven Zn application rates, ranging from 0 to 15 kg ha⁻¹ in 2.5 kg intervals, to quantify maize yield responses and determine the economically optimal Zn rate for maize production. Across all experimental sites and for the three growing seasons, maize grain yield with each treatment followed the order 15 kg Zn ha⁻¹ = 12.5 kg Zn ha⁻¹ = 10 kg Zn ha⁻¹ = 7.5 kg Zn ha⁻¹ > 5 kg Zn ha⁻¹ > 2.5 kg Zn ha⁻¹ > control, suggesting that 7.5 kg Zn ha⁻¹ is the optimal Zn application rate. However, based on agro-input prices at the local level and the farm-gate prices of maize, the potential gross profit resulting from Zn application was maximized at 5 kg Zn ha⁻¹. From the combined results, we conclude that, when the production objective is for yield optimization only, an application rate of 7.5 kg Zn ha⁻¹ provides the best results. However, unless premium prices are paid for Zn-enriched maize grains, then Zn application rate of 5 kg ha⁻¹ is economically justified for sustainable and profitable maize production in the Zn-deficient soils of the savanna AEZs of northern Ghana.</p>
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