

Article title	Synergistic effects of liming and balanced fertilization on maize productivity in acid soils of the Guinea Savanna agroecological zone of Northern Ghana
Topic Keywords	Grain, Nutrient use efficiency, Nutrient uptake, Harvest index
Authors	Sampson Agyin-Birikorang, Ignatius Tindjina, Raphael Adu-Gyamfi, Job Fugice Jr., Haruna W. Dauda, Albert B. Angzenaa & Joaquin Sanabria
Abstract	<p>Soil acidity and very low nutrient status are major production-limiting factors for maize production in most parts of the savanna agroecological zones (AEZ) of northern Ghana. Therefore, effective nutrient management is critical to increase productivity. During a two-year study across six locations in the Guinea Savanna AEZ in northern Ghana, we evaluated the interactive effects of liming and balanced fertilization on maize productivity in acid soils. Six fertilization strategies – (i) balanced (containing all essential limiting nutrients), (ii) balanced with sulfur omitted (minus-S), (iii) balanced with zinc omitted (minus-Zn), (iv) balanced with boron omitted (minus-B), (v) NPK-only, and (vi) control (no nutrients supplied) – were evaluated, each with or without liming. Applying only lime without fertilizer application increased maize yield from an average of $\sim 0.55 \text{ t ha}^{-1}$ to $\sim 0.92 \text{ t ha}^{-1}$. For NPK-only fertilization, liming led to an increase in yield from an average of $\sim 1.68 \text{ t ha}^{-1}$ to $\sim 2.84 \text{ t ha}^{-1}$. For balanced fertilization, lime application resulted in an additional maize grain yield of $\sim 53\%$ compared to treatment without lime application. With liming, the minus-Zn treatment resulted in a significant yield decrease of an average of $\sim 30\%$ compared to balanced fertilization, suggesting that combined application of lime and Zn should be advocated to better sustain crop productivity in this region. We conclude that, to improve maize productivity in acid soils in order to ensure increased profitability and improved household income, fertilizer recommendations that promote balanced fertilization must include liming as part of the nutrient application package.</p>
Citations	Sampson Agyin-Birikorang, Raphael Adu-Gyamfi, Ignatius Tindjina, Job Fugice, Haruna Waku Dauda & Joaquin Sanabria (2022) Synergistic effects of liming and balanced fertilization on maize productivity in acid soils of the Guinea Savanna agroecological zone of Northern Ghana, <i>Journal of Plant Nutrition</i> , 45:18, 2816-2837, DOI: 10.1080/01904167.2022.2046083
Link to the actual article	https://doi.org/10.1080/01904167.2022.2046083
Publication date	2022-03-01