## ABSTRACT

### Strategic Research in the Domain of Secondary Nutrients, Micronutrients, Liming and 4R Stewardship in Sub-Saharan Africa: Review

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Low levels of secondary and micronutrients, and soil acidity strongly challenge the attainment of two critical pillars of Climate Smart Agriculture (CSA); 1) secured food through increased productivity and (2) increased resilience to adapt to climate change. Despite this soil fertility trend, empirical and review studies on secondary and micronutrients, and soil acidity remain scanty few. This review is thus timely and imperative as it aims to; 1) piece together different strategic empirical research in the domain of secondary nutrients, micro nutrients, liming and 4R stewardship, and 2) give a snapshot of challenges in soil fertility research in sub-Saharan Africa. The review adopted multi-engine search including; Science Direct, Google Scholar, and Research Gate. Key findings of the review are; i) response of yield to application of secondary and micro-nutrients denotes hidden hunger of these nutrients; ii) Combination of lime and fertilizers has a better effect on yield than sole applications; iii) scarce lime markets in areas with profound acidic soils, iv) developing lime supply chain in areas with no assisting supply chains is expensive, and v) lack of robust policy, legal framework and political goodwill on fertility input markets. We propose a responsive soil-specific balanced nutrition framework supported by robust policy and legal frameworks in fertilizer and lime markets to address soil acidity, macro, micro and secondary nutrients. Next generation soil fertility management researchers and other stakeholders, supported by high-end assessment technologies, should conduct more secondary and micro-nutrient-specific empirical studies that involve different forms and rates to validate the framework on different soil types.



**Keywords:** Integrated soil fertility management, Lime, Biochar, Fertilizer application