

# Investment Case for Agricultural Lime in

# TANZANIA



Soil acidity, which inhibits root growth and nutrient absorption, reduces yields of major crops in Tanzania consequently adversely impacting employment and threatening food security of the country with an estimated 15% of rural households classified as food insecure and 15% more at risk of becoming food insecure. While several solutions address soil acidity, lime is the most easily available and effective to treat soil acidity in the country due to its impact on acid soils over a relatively short period of time, in-country availability, and relative low cost.

Realizing significant lime uptake is complex primarily due to: (i) the increase in yield resulting from application of lime is highly variable depending on crop type, variety, soil properties at time of application, and general agronomic production factors; (ii) the full benefits of liming are distributed over multiple growing seasons; and (iii) limited data exists to calculate likely yield response across Tanzania. Consequently, there is limited proof of concept, leading to low lime uptake. Varying degrees of challenges in demand, supply and the enabling environment further constrain lime industry growth. Limited awareness and knowledge of soil acidity management and cost factors further reduce demand for lime. The supply side challenges are high cost of lime driven by sub-scale and inefficient distribution.

Given the complexity of the problem, identifying nodes of entry that are likely to move needle in terms of economic benefit to suppliers and farmers is important. There is a need to identify crops aligned with the national agenda, that have the highest yield response to lime to evaluate the potential impact of lime on livelihoods. Subsequently, understanding where these economic surpluses exist enables selection of 'nodes of entry' for lime application.

## Potential areas to target

In Tanzania, SAGCOT and Lake Zone regions possess just under 50% (14 million ha) of the total cropland in the country of which 14% is highly acidic ( $\text{pH} < 5.5$ ). Moreover, the two regions produce 55% of the country's food and cash crops. Figure 1 presents the highest economic value areas in Tanzania.

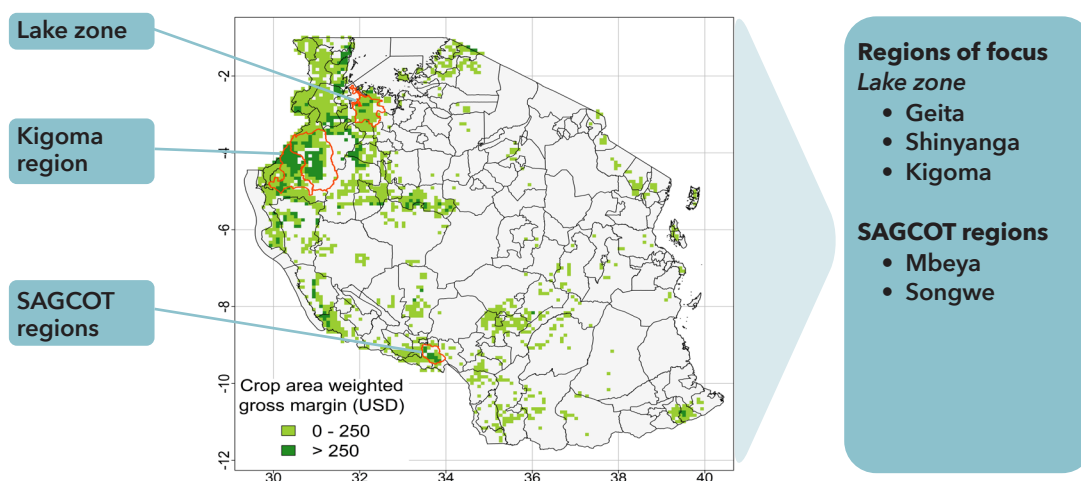


Figure 1: Highest economic value areas in Tanzania

## Expected return

In SAGCOT, bean, potato, sweet potato, and tobacco have the highest potential economic surplus. As given in Table 1, combined, these crops require 100,375 MT of lime to treat soil acidity with the potential to generate 14.4 million USD economic surplus, and a 10.04 million USD market for lime producers, at a price of 100 USD/MT of lime. Calculations are based on the sum of the first three years of surplus using a 50% discount rate for the second year and a 25% discount rate for the third year. In the Lake Zone province, bean, sweet potato, ground nut, banana, chickpea, potato, and tobacco potentially produce the highest economic surplus as a result of using lime. Combined, these crops need 656,635 MT of lime to treat soil acidity and can in turn generate approximately 100.1 million USD in economic surplus by the third year, and approximately 65.7 million USD market for lime producers.

**Table 1: Summary of economic opportunities for lime in SAGCOT and the Lake Zone of Tanzania**

	SAGCOT	Lake Zone
Total market size for lime (MT)	100,375.3	656,635.5
Total market size for lime producers (USD)	10,037,530	65,663,550
Total economic surplus (USD)	14,407,957.58	100,126,598.70

Realizing this economic surplus will require targeted investments to increase lime uptake and improve commercial viability of supplying lime. Scaling demand for lime will require conducting awareness campaigns focused on why lime is needed, how it is used, and corresponding benefits. Access to infrastructure such as demonstration plots, soil testing tools, and storage facilities closer to farmers can drive the increase in lime demand. There is a need to earmark patient capital and innovative finance products to support suppliers in quality production and improving distribution systems. Providing business support is important to processors in need to become investment ready; and investments to get to scale on supply side could reduce costs.

## Complementary interventions required

Before large investments are made in the sector, strengthening base of evidence in terms of different crop yield responses to lime and the impact of various factors on yield response is critically needed. The yield response data used to develop this analysis are preliminary, making it difficult to draw conclusive recommendations. Beyond lime, testing and comparing the effects of other potential interventions for management of soil acidity is essential to select the most appropriate course of action. Consideration of upstream solutions to limit the spread of acidic soils, that entails the promotion of non-acidifying fertilizers, is an example.

While the study of lime and its crop yield effects in Tanzania is at its infancy, it acts as a starting point to aggregate efforts around developing demand and establishing supply for lime in the country. Firstly, we recommend piloting activities in the target regions to establish a proof of concept on lime use. Secondly, further research needs to be conducted on crop yield response to lime in various regions and crops that could provide recommendation on the use of lime.

**Acknowledgements:** Bill and Melinda Gates Foundation (BMGF) for financing the Guiding Acid Soil Management Investment in Africa (GAIA) project and Dalberg for developing the initial investment case document

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