

# Investment Case for Agricultural Lime in KENYA



Soil acidity currently affects 13% (7.5 M ha) of Kenya's cropland. Acidic soil is a major cause of crop yield reduction and consequently reduced agricultural incomes. Agricultural productivity for smallholders has stagnated in recent years: (i) crop yield per ha, particularly for staples that guarantee food security are on the decline; and (ii) earnings from cash crop are under pressure. Among available solutions to treat soil acidity, lime proves to be the most effective approach to achieve efficient agricultural output, due to its ample local availability, effectiveness, impact on soil properties, and is the most affordable option at scale.

However, determining actual benefit of lime is challenging due to interlinked factors. Lack of authoritative information on liming practices limits lime effectiveness. In Kenya, lime application practices are unharmonized with no authoritative source on the best practice application methods nor the benefits of lime. Similarly, according to studies, response time of lime can vary between 6 months to over 3 years depending on soil properties, acidity level and crop type. This is further compounded by inconsistency in lime quality that is mainly driven by: (i) low demand which disincentivizes manufacturers on improving quality, and (ii) limited quality checks on lime as it is mainly collected as a by-product from cement manufacturers.

To realizing economic opportunity for lime, it is important to identify the right 'nodes of entry'—regions and crops that are likely to generate the highest economic surplus to farmers due to lime application and can serve as proof of concept for scaling lime across the country in the future—that can provide benefits both to farmers and lime producers.

## Potential areas to target

The Western and Central regions of Kenya have the highest economic surplus from lime usage. Figure 1 presents the highest economic value areas and crops.

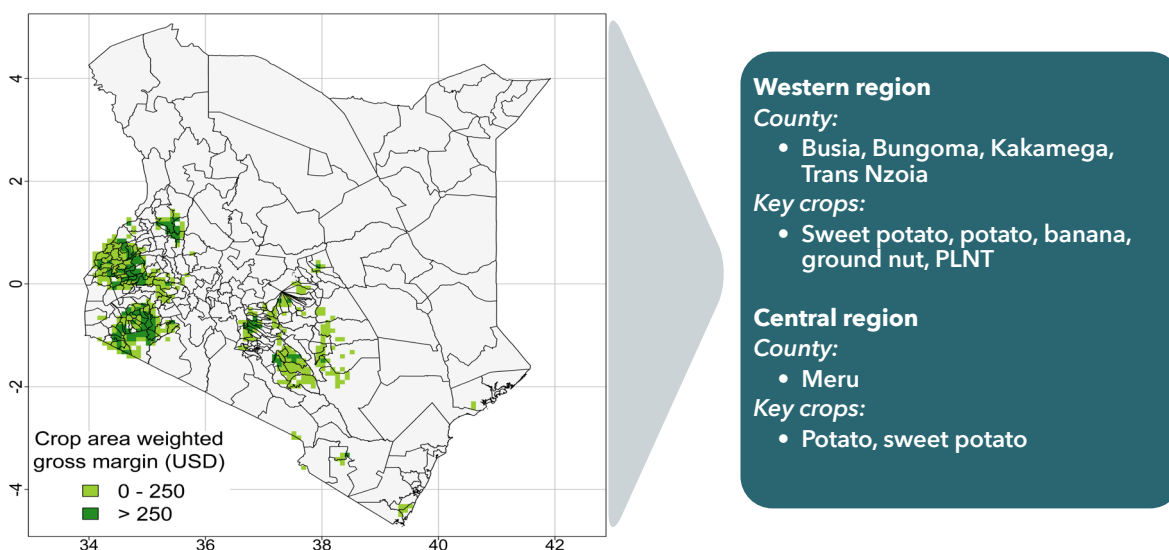


Figure 1: Highest economic value areas and crops in Kenya

## Expected return

Table 1 presents summary of economic opportunity for lime in the Western and Central Regions of Kenya. In the Western region, sweet potato, potato, banana, ground nut, and PLNT have the highest economic potential. The region has about 130,000 ha of cropland that is highly acidic (pH<5.5). However, the target clusters are of much lower acreage, translating to a total need for lime of 45,686.81 MT annually. In the Central region, potato, and sweet potato generate the highest economic response to lime application. The total acidic area in Meru County is 30,000 ha. However, the target clusters are of much lower acreage, translating to a total demand for lime of 1,418.27 MT annually. The economic surplus generated due to the use of lime is about 1.02 million USD. 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.

The key constraint to adoption of lime in the Western region is high farmgate prices that are primarily driven by inefficient production. Production capacities in the region are unutilized. Homa Lime, the main lime producer in the region, has a capacity of 36,500 MT and is located about 110 km from the key counties. However, its current annual production lies at 7,300 MT. The main barriers to adoption of lime in the Central region are high distribution costs and insufficient supply. The closest manufacturer, ARM Cement, is 300 km away which increases the total farmgate price of lime by USD 43. Farmers in the region also have limited access to lime; lime is mainly accessed through agro-dealers.

**Table 1: Summary of economic opportunity for lime in the Western and Central Regions of Kenya**

	Western province	Central province
Total market size for lime (MT)	45,686.81	1,418.27
Total market size for lime producers (USD)	4,568,681	141,827
Total economic surplus (USD)	14,769,762	1,023,494

To unlock the opportunities in these target markets, challenges need to be addressed across demand, supply, and enabling ecosystems to scale lime adoption. Provision of subsidies or lower cost credit facilities would make lime more affordable to farmers and help increase uptake. Targeted awareness, focused on the highest soil acidity areas, should be prioritized. Increased soil testing by county governments can help raise awareness on soil acidity and provide tailored recommendations on lime use. Increasing access to finance, generating favourable national agricultural lime policy, and building evidence base of lime use in untested regions are required.

### Complementary interventions required

Upstream solutions also need to be taken into consideration to limit spread of acidic soils. This entails the promotion of non-acidifying fertilizers that can be achieved by working with fertilizer manufacturers and agro dealers to promote the use of non-acidifying fertilizers and driving awareness among farmers on effects of acidifying fertilizers on soils and crop yields. However, there are trade-offs to using non-acidifying fertilizers such as higher transport and labour costs. While the study of lime and its effects on crop yield in Kenya is at its infancy stage, it acts as a starting point to aggregate efforts around developing demand and establishing supply for lime in Kenya. We recommend piloting activities in the target regions to establish a proof of concept on the use of lime. Moreover, 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.

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