Investment Case for Agricultural Lime in ETHIOPIA

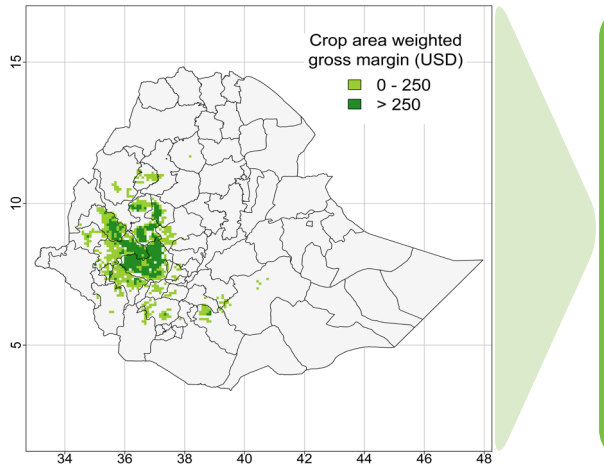
More than 40% of Ethiopia's cultivated land is currently affected by soil acidity with 28% (3.7 million hectares) identified as highly acidic (<5.5 pH). Acidic soils are particularly prominent in the SNNP (72%) and Oromia (60%) regions. Soil acidity reduces yields of major crops by more than 50% in the country, in turn affecting food security and the livelihoods of farmers. Lime is a suitable and abundantly available solution to treat soil acidity in the country due to ample reserves, efficacy, local availability, and cost effectiveness.

However, making the case for significant lime uptake is complex. The literature indicates that reaction time of lime can range anywhere from 6 months to over 3 years, depending on soil properties, acidity level and crop type. These interlinked dependencies create uncertainty amongst farmers leading to limited lime uptake. Additionally, while the amount of fertilizer and other inputs farmers often use are measured in kilograms/ha, lime is typically measured in tons/ha. This presents a particular logistical challenge, as it increases the cost of distribution, especially for farmers who carry their inputs to their agricultural plots using traditional methods.

Given the complexity of the issue, identifying nodes of entry along the value chain that are likely to bring about economic benefits to suppliers and farmers is critical. On the demand side, current level of awareness raising interventions have been limited to demonstration farms. On supply side, due to poor road networks and infrastructure, distribution costs account for 64% of the total end-user-cost of lime. On the enabling environment side, a wide range of limitations prevail around access to financing with inflexible loan repayment period and various fees incurred along the value chain. Given these challenges, demonstrating proof of concept to farmers, and creating sufficient evidence of demand to attract participation and investment to improve supply, and incentivizing the need to address these inefficiencies is critical.

Potential areas to target

Based on soil acidity levels, the northwestern SNNP and the western Oromia regions have the highest potential economic surplus from the usage of lime on anchor crops: lentil, potato, sweet potato, bean, and ground nut in western Oromia, and potato, lentil, and sweet potato in northwestern SNNP. Figure 1 presents the highest economic value areas in Ethiopia.



Zones of focus in the Oromia region

- Horro Guduru Wollega
- East Wollega
- West Wollega
- West Shewa
- Jimma
- Ilubabor
- Kellem Wollega

Zones of focus in the SNNP region

- Northeastern Dawro
- Keffa
- Sheka

Figure 1: Highest economic value areas in Ethiopia

Expected return

As given in Table 1 that presents summary of economic opportunities of lime in western Oromia and northwestern SNNP regions of Ethiopia, the potential economic surplus because of using lime (based on the assumption that cost of lime is $100 USD/Mt) is 93,468.93 USD in the northwestern SNNP region and 11.11 million USD in the western Oromia region. 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.

Table 1: Summary of economic opportunities of lime in western Oromia and northwestern SNNP regions of Ethiopia

	Western Oromia	Northwestern SNNP
Total market size for lime (Mt)	77,780.81	255.93
Total market size for lime producers (USD)	7.78million	25,593
Total economic surplus (USD)	11.11 million	93,468.93

Capturing this opportunity in the western Oromia and northwestern SNNP regions requires targeted interventions on demand, supply, and enabling sides. Engaging in demand generating activities to disseminate proof of concept is essential to increasing uptake in both regions, with special attention to SNNP region where demonstration efforts have been relatively modest and is located at great distance from supply areas. On the supply side, leveraging existing producers in Oromia—lime crushers and cement factories—that have already reached economies of scale in production and transportation can significantly address any supply gaps in the SNNP. There is also a need to de-risk investments for the private sector through reduction of fees incurred along the value chain and ensuring ease of access to finance through loans at sub-market rates and providing business development services for small-scale lime crushing facilities.

Complementary interventions required

Beyond lime, testing and comparing the effects of other potential interventions for soil acidity management is vital to select the most appropriate course of action. For instance, consideration of upstream solutions to limit spread of acidic soils that entails the promotion of non-acidifying fertilizers is worthwhile. This 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 the effects of acidifying fertilizers on soils and crop yields. However, there are trade-offs to using non-acidifying fertilizers such as higher transport and labor costs.

Given that the yield response data that is currently available is at an early stage and is being refined, drawing causation inferences is difficult. Therefore, improving the data before making large investment cases for the sector is important. Once this is achieved, comparing lime to other potential interventions that can improve yields and farmer livelihoods so that the farmer can make the best value-for-money farm investments is critical.

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*

Contacts: *For further details, please contact us: Moti Jaleta, m.jaleta@cgiar.org; João Silva, J.silva@cgiar.org; Jordan Chamberlin, j.chamberlin@cgiar.org*