

Effects of lime and fertilizer on soil properties and maize yields in acid soils of Western Kenya.

Many soils in Western Kenya are acidic and deficient in nitrogen and phosphorus. Acidity hinders crop responses to fertilizers applied to remedy nutrient deficiencies. The common liming materials used to ameliorate acidity are Calcium Oxide (CaO) and Calcium Carbonate (CaCO₃) in powdery formulations. Broadcasting these materials by hand followed by incorporation is recommended on smallholder farms to enhance their effectiveness but this is laborious. Granular lime which is easier to handle was recently introduced but there is little information on its effectiveness. This study therefore tested the effects of CaCO₃, CaO and granulated lime, applied alone or in combination with fertilizer (Diammonium phosphate (DAP) + calcium ammonium nitrate (CAN)), on maize yield for three seasons, 2015 long rains (LR), 2015 short rains (SR) and 2016 LR at four sites: Butere, Emuhaya, Mumias and Kakamega North in Western Kenya. CaCO₃ and CaO were applied at 2 t ha⁻¹ once in the 2015 LR while granular lime was applied at a ratio of 1:1 with DAP per season. There was no significant effect of lime type on maize yields. Maize did not respond to lime without fertilizer. Application of lime, irrespective of the type, with fertilizer, did not give yields that were significantly different from those of fertilizers alone except at Butere in the 2015 LR when application of CaO and CaCO₃ with fertilizer significantly out yielded those with fertilizer applied alone. Similar results were obtained with granular lime in the 2015 SR at Emuhaya. It was concluded that except for Butere, where maize did not respond to fertilizer alone, the

other sites are not sufficiently acid to permit the solubility of Al to toxic levels for maize. More attention should therefore be focused on N and P replenishment at these sites than liming. At Butere, soil acidity is a problem and lime should be applied together with fertilizers.

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