

**Koffa, S, D. Garrity and M. Nguigi. 2000. Growth response of six tropical tree species to fertilizer and fertilization methods on sites of varying altitudinal gradients in Lantapan. ICRAF, Bogor, Indonesia.**

**Abstract:** Seedlings of *Albizia lebbekoides*, *Eucalyptus robusta*, *Eucalyptus torilliana*, *Gmelina arborea*, *Pterocarpus indicus*, and *Swientenia macrophylla* were fertilized, outplanted and maintained on 3 sites of varying altitudes (470 masl, 780 masl, 1330masl) on-farm in upland villages for 21 months. Side-dressing and controlled release served as fertilizer treatments.

Statistically significant differences in the measured traits, plant height and diameter, were noted between fertilized and non-fertilized plots of *E. robusta*, *G. arborea* and *S. macrophylla*. No significant differences were observed of fertilized and non-fertilized plots of *A. lebbekoides*, *E. torilliana* and *P. indicus* on one hand, and between the fertilization methods on the other. Altitude, a major topographic factor, influenced plant response to fertilizer by its effect on soil temperature and the chemical and physical properties of soil.

Temperature and quantities of Calcium, Magnesium, Phosphorus and Potassium decreased with increased altitude, while organic carbon and organic matter increased. Other factors which affected plant response to fertilization were the age of growth and development, and genotype x environment interaction. Plant response to applied fertilizer was mostly on the site with deficient quantities of essential nutrient elements, and that was the site at the highest altitude in the study. An understanding of the effect on topographic variables on soil properties could serve as an index in fertilizer use efficiency for smallholder-managed tree production systems that are located on fragile and degraded uplands, such as those in Lantapan.