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Biochar shows little impact on soil fertility

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First author Esthela González Sarango stands next to two-year-old Brazilian firetrees at an afforestation experiment in the Ecuadorian Amazonia in 2011. Photo by Carlos Valarezo Manosalvas.

On the hillsides of the Zamora-Nangaritza river network in the southern Ecuadorian Amazonia, planting new forests (afforestation) on degraded pasture soils has been a challenge. In an attempt to mimic the fertile Amazonian Terra Preta soils, which contain biochar, a team of researchers tried adding biochar to these degraded soils, both alone and with mineral fertilizer plus lime, to improve fertility. They published their findings in a recent issue of the *Soil Science Society of America Journal*.

The team applied charcoal bought on the local market to degraded, strongly weathered soils (Ultisols) planted with two tree species at two locations. They found that up to 6 Mg ha^{-1} increased the bioavailability of only three of 10 of the nutrients they studied and increased topsoil retention of only two. This weak effect helps explain previous findings that biochar did not promote tree growth.

More research is needed to define for which site conditions and application rates biochar could improve soil fertility sufficiently and to consider logistic and financial issues related to higher biochar application rates, which may be necessary to see significant improvements.

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Gonzalez Sarango, E.M., Leimer, S., Valarezo Manosalvas, C., & Wilcke, W. (2022). Does biochar improve nutrient availability in Ultisols of tree plantations in the Ecuadorian Amazonia? *Soil Science Society of America Journal*. **https://doi.org/10.1002/saj2.20421**

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